Soil Report
Proposed Oak Park Village
St. Louis Park, Minnesota
by
Soil Testing Services of Minnesota, Inc.

SOIL TESTING SERVICES OF MINNESOTA, INC.
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MINNEAPOLIS, MINNESOTA 55441 612–559–1900

September 8, 1977

Diversified Equities Corporation
600 Chamber of Commerce Building
15 South 5th Street
Minneapolis, Minnesota 55402

Attention: Mr. Jon Dickerson STS Job No. 90920-B

Re: Supplementary Subsurface Investigation for the Proposed Oak Park Village at the Southwest Corner of 32nd Street West and Louisiana Avenue in St. Louis Park, Minnesota.

Gentlemen:

In accordance with your written authorization received in our office on August 26, 1977, the above referenced subsurface investigation has been completed. Enclosed herein please find the results of this investigation, and the engineering soil report prepared for this project. Three (3) copies of this report have been sent to the above address; a single copy has been submitted to the Architect, Miller, Hansen, Westerbeck, & Bell; and a single copy has been submitted to the St. Louis Park Housing and Redevelopment Authority.

In summary, variable soil conditions were encountered within the project site. These soil conditions can generally be separated by area; thus, different foundation alternatives appear feasible and practical for various portions of the site. Each of these foundation alternatives is considered in this report.

If you have any questions regarding this report, or if we can be of further assistance to you, please do not hesitate to contact us.

Very truly yours,

SOIL TESTING SERVICES OF MINNESOTA, INC.

William C. Kwasny
Registered Professional Engineer, Minnesota

WCK/ljl

cc: Miller, Hansen, Westerbeck, Bell, Architects, Inc.
Attention: Mr. Ed Bell

cc: St. Louis Park Housing & Redevelopment Authority
Attention: Mr. William Thibault
Executive Director

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATED 9-8-77 REG. NO. 11427

INTRODUCTION

The supplementary subsurface investigation for the proposed Oak Park Village has been completed. A total of sixteen (16) additional borings, numbered boring 22 through boring 38, were performed at this site. The logs of these borings, along with a soil boring location diagram, are included with this report.

The original subsurface investigation report for this project was submitted to the St. Louis Park Housing & Redevelopment Authority on February 11, 1977. Subsequent to submittal of that report, the locations of the proposed housing units were rearranged on the site, thus requiring additional borings to determine soil conditions at the actual building locations. In addition to the boring location diagram, a chart is included in the Appendix of this report, giving the revised building numbers and finished floor slab grade within each individual building, and the boring numbers pertinent to the specific buildings.

Based on the latest plans, it is our understanding that all of the buildings will be two-stories in height, with the exception of building number 1, which will be three stories in height. All of the buildings will utilize a wood frame construction with architectural brick veneer strips at various locations on the building. We anticipate that the foundation loads under the load bearing wall should not exceed 3 to 4 kips per lineal foot, for both interior and exterior walls.

Several single-story garage structures are to be located in the northeast corner of the site, as well as on the south central portion of the site. We anticipate that relatively light foundation loads would be generated by these structures.

Paved parking and roadway areas will be provided on the northerly, easterly, and south central portions of the site. The parking lot pavements will be utilized primarily be light passenger vehicles, consisting of automobiles and pickup trucks. However, occasional heavy wheel loads will probably be imposed on pavements such as by delivery trucks and refuse collection vehicles.

The purpose of this report is to describe the soil and ground water conditions encountered in the borings; to analyze and evaluate the data obtained; and to present recommendations for feasible methods of foundation design and construction.

SUBSURFACE INVESTIGATION PROCEDURES

A total of sixteen (16) borings were drilled for this phase of the investigation. The general boring locations were chosen during a discussion between Mr. Gary Frana and the writer. The specific boring locations were chosen by the writer, based on a revised building layout plan received from the Architect. The borings were laid out in the field by the writer and another Project Engineer from the staff of Soil Testing Services of Minnesota, Inc. The base point used for this investigation was the northeast property corner. The borings were laid out using a transit and taping.

With the exception of borings 22 and 23, all of the borings were drilled with truck mounted drill rigs. Borings 22 and 23 were drilled with a rig mounted on a Bombardier all-terrain vehicle, since extremely heavy rain during the course of the field investigation caused the site to be extremely difficult to traverse with trucks.

Some of the borings were advanced to full depth using continuous flight augers, while other borings were advanced to the 8 to 15 foot depths with continuous flight augers. In those borings which were drilled to greater depths, the wash boring technique was employed, wherein the borehole is advanced by using rock bits and drilling fluid which consisted of Revert drilling mud. When the wash boring technique was employed, NX steel casing was used in the upper level of the boring, to prevent borehole cave in.

All soil samples were obtained utilizing the Split Barrel sampling procedure in accordance with ASTM D-1586-67. A copy of this ASTM Specification describing the manner in which the soil samples were obtained, is included in the Appendix of this report. Soil samples obtained in this manner were examined in the field, sealed in glass jars to prevent moisture loss, and returned to our laboratory for further examination and testing.

Ground water level observations were noted in the soil boreholes during and after completion of the drilling operations. In addition, six day water level readings were taken in all of the borings. These readings are indicated in the lower left corner

of the respective soil boring logs. A discussion of the ground water table conditions at this site is included in a later section of this report.

LABORATORY TESTING PROGRAM

The laboratory testing program consisted of determining the water content and unconfined compressive strength of cohesive and semi-cohesive soils recovered from the boreholes. The unconfined compressive strength was determined by means of the hand penetrometer test. The results of this type of test are indicated on the soil boring logs by means of an open circle with an asterisk. Water content test results are shown on the soil boring logs by means of a darkened circle. The Standard Penetration values obtained in the Split Barrel sampling are indicated on the soil boring logs by means of a crossed circle. These values can be used to give an indication of the in-place relative density of granular soils.

Upon completion of the laboratory testing program, each of the soil samples was thoroughly examined by an experienced Soil Engineer to determine the major and minor soil components, while also noting the color, degree of saturation, and any conspicuous lenses or seams found in the samples. The soils were then visually classified on the basis of texture and plasticity in accordance with the Unified Soil Classification System. The capitalized symbol in parentheses following the written soil description on the boring logs is the approximate group symbol according to this classification system. A chart describing the properties of the various groups under this classification system is included in the Appendix of this report.

Upon completion of the classification, the Engineer stratified the soils by type as shown on the soil boring logs. Please note that these stratification lines represent the approximate boundaries between soil types. The actual transition between soil types in-situ, may be gradual, in both the horizontal and vertical direction. The soil samples recovered in this investigation will be retained in our laboratory for a period of 60 days after the date of this report. If further instructions with respect to the disposition of these samples has not been received within this time,

the samples will be discarded.

SITE CONDITIONS

At the time of the supplementary subsurface investigation, the site of the proposed development was vacant. It is our understanding that some site grading had been performed between February of 1977, and August of 1977. This is reflected in grades that are somewhat changed from the previous elevation. That is, the site at the time of the supplementary subsurface investigation was on the order of 12 to 24 inches lower in some locations. In addition, it appears that random piles of fill which had been observed under the snow on the southeast portion of the site had been removed.

SOIL CONDITIONS

The specific soil conditions found in the borings are indicated on the respective boring logs. In summary, variable soil conditions were encountered throughout the site. Fill material was encountered at the ground surface in all of the borings. The fill material was found to be on the order of 2 feet in thickness in the northerly portion of the site, to as deep as 10 feet at borings 24, 28, and 37. Organic soils were found to underlie the fill within approximately the southerly 2/3 of the site. The organic soils range from highly compressible black peat, to black silt. The organic soils range from approximately 12 inches in thickness, to as much as 9 feet in thickness at the location of boring 37.

Underlying the fill materials and organic soils (where encountered), loose to medium dense granular soils, consisting of fine to coarse sand and gravel with lesser portions of silt, were encountered. These granular soils were generally noted to be brown and gray-brown in color in shallower depth ranges, and changed to predominantly gray colors with increasing depth. Some strata of soft to stiff cohesive soils consisting of gray brown and gray clayey silts and silty clays, were also encountered underlying the organic soils.

The predominant factor which emerges from the soil borings performed at this site, is that the soil conditions are variable. These conditions vary relatively rapidly in both the horizontal and vertical extent, over relatively short distances. Based on the previous history of this site, wherein a wood creosote treating plant was operating on the site, holds the fact that much of the creosote contaminating material has been dug out and replaced, and these conditions are not unusual.

GROUND WATER CONDITIONS

Water level observations were obtained in the boreholes during and immediately after completion of the drilling operations. In addition, water level readings were taken at an extended interval following completion of the boring operations.

Since relatively permeable granular soils were encountered over much of the site, the readings which were obtained should be generally indicative of the actual long-term hydrostatic ground water table. That is, in these types of soils, the ground water level usually comes to equilibrium relatively quickly. Based on these readings, it is estimated that the true hydrostatic ground water table was located at depths on the order of 15 feet below the existing ground surface at the time that the borings were performed. However, in some cases, shallower ground water level readings were obtained, such as in boring 37. We are of the opinion that the shallower water level readings, such as reflected in boring 37, are actually perched ground water table conditions. Perched ground water conditions are encountered when water infiltrating downward from the surface, or moving laterally across the site, is impeded or restricted from continued flow due to a strata of less permeable soils such as silty clays or clayey silts.

Based on the readings obtained, we estimate that the true hydrostatic ground water table at the time of the subsurface investigation was located at approximately elevation +178 to +179 at the northern end of the site, and within the range of elevation of approximately +172 to +176 towards the southerly end of the site. Thus, it appears that the ground water table slopes downward towards the south in the same

general direction as the ground surface elevations at the site, with a total difference in ground water table elevation on the order of 3 to 4 feet.

Please note that in the subsurface investigation of February, 1977, the ground water table was found to be highest at approximate elevation +175 at the north, to +172 at the south. Thus, it can be seen that the ground water table has risen since that time. This is not unexpected, since the ground water tables during the Winter of 1976 and Spring of 1977 reflected the abnormally low rainfall conditions occurring in Minnesota during 1976. An estimated rise of the ground water table on the order of 2 to 3 feet would have been predicted when normal rainfall patterns were to return. Since the normal average rainfall has occurred during 1977, it can be seen that this rise in the ground water table has indeed been observed. We anticipate that the hydrostatic ground water table would probably not rise severely in the future, and should not rise to such a degree as to effect performance of foundations for the proposed structure.

Continued fluctuations in the level of the ground water table should be anticipated throughout the years, depending upon variations in precipitation, evaporation, surface runoff, and infiltration. Artificial regulation of the ground water table can also occur by means of dewatering operations or pumping from deep wells.

Previous Investigation A previous subsurface investigation at this site had been performed by Soil Engineering Services, Inc., of Minneapolis, Minnesota in October, 1969. We have reviewed this report, including the logs of the borings which were performed for that investigation. Similar soil and ground water conditions were encountered in both phases of our subsurface investigation, when compared to this previous program. This previous investigation also revealed that the ground water table sloped downward to the southwest, in the general direction of the surface topography.

ANALYSIS AND RECOMMENDATIONS

The analysis and recommendations for each individual building are presented separately in this section of the report.

Building No. 1 This structure will be a three-story building, located at the south end of the project site. Finished first floor elevation will vary from +194.3 at the east end of the building, to +187.3 at the west end of the building. The existing grade at this building location at the time of our subsurface investigation, ranged from +189.2 at the east end, to +187.6 at the west end. The soil conditions in this building consisted of fill overlying organic soils in borings 31, 33, and 34. This fill is approximately 4 feet deep at boring 31, extending to approximately 9 feet at boring 34. The organic soils at boring 31 consisted of black silt to a depth of 6 feet, continuing to a black fibrous peat extending to 15 feet in boring 34. At boring 34, the organic soil overlies soft clays extending to a depth of approximately 24 feet. The ground water table in this area is at a depth of approximately 15 feet.

Because of the variable soil conditions in this building, we recommend that two types of foundations be used, in order to achieve the most economical foundation system. For approximately the eastern 3/4 of the building, a spread footing foundation could be used after removal of the existing fill and organic materials, and replacement with a select compacted backfill. In the westerly 1/4 of the building, which extends to the northwest, where the organic soils and underlying soft clay extends to significant depths below the ground water table, we recommend the use of a driven pile foundation, consisting of treated timber piles. We are of the opinion that a hybrid foundation of this type can be successfully designed and constructed, utilizing construction joints at the appropriate location in the building to allow for differential settlement between the two segments.

In that portion of the building to the east of boring 9, we recommend that the existing fill and underlying organic material, as well as any underlying soft clays or silts which are found, be excavated to the naturally-occuring granular soils.

This overexcavation would thus extend to a depth of approximately 12 feet at boring 31, to as deep as approximately 15 feet at boring 33. Variations in the depth of overexcavation may occur between the borings. The overexcavation to remove the unsuitable soils should extend laterally beyond the outside edges of the footings, a depth equal to the depth of overexcavation below the bottom of the footings.

To backfill this overexcavation, a select granular material should be used. A recommended gradation for this material is included in the Appendix of this report. Because the ground water table may be encountered at or near the bottom of this excavation, we recommend that silty sand or uniformly graded fine sands or cohesive material not be used as backfill for at least the first 2 feet at the bottom of the excavation. The backfill should be placed in loose lifts no thicker than approximately 9 to 12 inches, and should be mechanically compacted to at least 95% of the maximum Modified Proctor Dry Density according to ASTM D-1557-70. Spread footing foundations and the floor slabs of the building could then be supported on this backfill.

Exterior spread footings and footings in unheated portions of the building should be maintained at least 4 feet below final grade, which will descend from east to west across the building location. At the east end of the building, we anticipate that the final exterior grade would be at approximately elevation +194, while at the westerly end of that segment to be built on spread footings, final exterior grade would be approximately +189. Thus, footings supported 4 feet below this grade would be founded within the range of elevation of +189 to +190 at the east end; to approximately +184 to +185 at the west end. Spread footing foundations supported within this range of elevation, on a select compacted granular backfill assiduously placed as described above, over an adequate subgrade of non-organic undisturbed granular soils, may be proportioned for a net allowable soil bearing pressure not to exceed 4000 pounds per square foot. The net allowable soil bearing pressure refers to that pressure which may be transmitted to the foundation soil in excess of the pressure due to the final minimum depth of overburden.

We recommend that a minimum footing width of at least 20 inches for continuous footings, and at least 30 inches for isolated column footings, be used in order to avoid excessively narrow footings. The factor of safety with respect to bearing for this design would be in excess of 3. Settlements which should occur to the building should be less than 1/2 inch, and differential settlement should be less than 1/2 this amount.

For the westerly portion of the building (in the area of borings 9 and 34), we recommend that a treated timber pile foundation be used. Based on the soil conditions encountered in boring 34, considering a pile with an 8 inch tip and 12 inch butt, we anticipate that the piles would have to be driven at least 20 to 25 feet into the medium dense granular soils underlying the soft silty clay, in order to achieve a design pile capacity of 20 tons per pile. Thus, pile lengths on the order of 45 to 50 feet may be required for this section of the building. The actual pile lengths may vary because of varying soil conditions between the boring locations. The piles should be designed using appropriate dynamic pile driving formula, and the pile construction should be inspected in the field by an experienced Foundation Engineer to ascertain that the piles are being driven to proper bearing. The pile design should take into account negative skin friction (downdrag) caused by future settlement of the existing fill and underlying compressible soils. This force may amount to as much as 10 kips per pile. Also, if pile groups are used, a foundation review should be made to determine if a pile capacity reduction is applicable.

With the use of the pile foundation, we recommend that a structural floor slab be incorporated in the building. The purpose of using a structural floor slab is to minimize differential settlement between the pile-founded building walls, and a floor slab supported over the compressible fill and organic materials. In addition, utility connections for lines installed within the fill material over the compressible organic soils, should be flexible at this end of the building in order to permit differential settlement without disturbing service.

Building No. 2 The soil conditions at building number 2 are reflected in borings 35, 36, and 37. These soil conditions are somewhat similar to those conditions found in building 1, in that for the southerly half of the building, the soil conditions consisted of silty sand and clay fill overlying compressible peat, to depths on the order of 12 to 14 feet. The soils underlying the organic soils and soft clay are medium dense sands. At the location of boring 37, the soils consisted of fill overlying peat, organic clay, and soft silty clay to a depth of approximately 25 feet. Thus, removal of compressible fill and organic soils and soft clays at this building would not be feasible at the location of boring 37, whereas it may be feasible at the location of boring 35 and 36. Because of the relatively short length of this building, we are of the opinion that the most suitable foundation design for this building would consist of driven treated timber piles. The pile design and floor slab design for this building should be the same as recommended for the westerly portion of building number 1. That is, the recommendations with respect to the type of pile and approximate length of pile needed to develop a 20 ton pile capacity, have been described above.

Building No. 3 The soil conditions at the location of building number 3, are reflected in borings 26, 27, and 28. The soil conditions here consist of fill material overlying organic soils comprised of a black sandy silt and black organic peat. These soils extend to a depth of approximately 6 feet at boring 26; 13 feet at boring 27; and 15 feet in boring 28. Thus, we feel the most feasible foundation type for this building would be to overexcavate the existing fill and the underlying organic soils and soft silty clay and clayey silt, and then backfill the excavation with a select compacted granular material as described previously in this report. Lateral oversizing of the excavation, as described for building 1, should be followed. The subgrade over which the fill is placed would vary from a stiff brown silty clay as

found at boring 26; to medium dense silty sand in boring 27; to a stiff clayey silt at boring 28. After this select granular fill is placed and compacted as described in a previous section of this report, a spread footing foundation could be used.

The exterior finish grade around this building would be on the order of +191 to +192. Therefore, footings supported at 4 feet below final grade would be founded within the range of elevation of +186 to +187. These footings should be supported on select compacted granular backfill. These footings may also be proportioned for a net allowable soil bearing pressure not to exceed 4000 pounds per square foot. Settlement which may occur to this structure should be less than 1/2 inch and differential settlement should be less than 1/2 this amount. Again, the factor of safety with respect to bearing would be in excess of 3. The same limitations on minimum footing widths would apply to this building, as recommended previously in this report.

No removal of soil

Building No. 4 The soil conditions in this building are shown in borings 24 and 25. At this building, the soil conditions consist of fill to a depth of approximately 10.5 feet at boring 24, and fill extending to a depth of approximately 8 feet at boring 25. At boring 24, the fill overlies a 2 feet thick stratum of black silty fine sand in a very dense condition, containing only a trace of organic material. There was no organic soil found below the fill in boring 25, although the fill itself is loose. Thus, for this building, we recommend that a spread footing foundation supported at normal frost depth be used, with the following qualifications. The first qualification would be that a very careful inspection of the foundation excavation be carried out at this building, consisting of an experienced Foundation Engineer performing hand auger borings approximately every 20 to 30 feet of length along the bottom of footings. The purpose of this detailed inspection is that variable soil conditions, including buried organic soils, were found in other portions of the site, and buried organic soils may occur between the locations of boring 24 and 25 that could not be found in the borings themselves. This inspection should also include compaction testing of the fill material at footing depth, by using a sand cone test or a nuclear density

meter, in order to determine the density of the soil within 3 feet from the bottom of footings. At the location of boring 25, the existing fine sand fill was in a medium dense condition, while the silt at boring 25 was found to be loose. Other zones of this loose fill material may also exist. For the use of bearing pressure no greater than 3000 pounds per square foot for this building, we recommend that the existing fill be recompacted in-place to at least 93% of the maximum Modified Proctor Dry Density, to a depth of at least 36 inches below the bottom of footings.

We would anticipate that spread footing foundations at this structure would be supported within the range of elevation of +186 to +187. Footings at this depth thus, would be found on existing granular fill consisting of brown fine sand, silty fine sand or silt. For maximum bearing pressure given above, on the soil encountered in these borings, we anticipate that total settlement of the structure may be on the order of 1/2 to 3/4 inch, with differential settlement being on the order of 1/2 this amount. The factor of safety with respect to bearing for this design, should be in excess of 3.

No excavation

Building No. 5 The soil conditions at this building are described in borings 22 and 23. The soil conditions consist of approximately 2 feet of dark brown silty fine sand fill at the surface. Underlying the fill material was a medium dense, naturally-occuring, granular soil consisting of brown fine sand, yellow-brown silty sand, and brown fine to coarse sand.

The finished first floor grade for this building will be +198.6. Thus, approximately 4 to 5 feet of fill will be placed around this building to achieve final grade. We recommend the use of a spread footing foundation for this building. The spread footings should be supported at least 4 feet below final grade, and would be founded within the range of elevation of +193 to +194, or at approximately the grade existing at the time of the subsurface investigation. Thus, a first recommendation prior to the placement of any fill around this building, is to compact the existing surface soil, since the non-organic granular fill at the location of boring 22

was found to be loose within the upper zone. The fill material should be compacted to at least 95% of the maximum Modified Proctor Dry Density. Spread footing foundations supported on this material, or over the existing granular fill material having a Standard Penetration value of at least 10 blows per foot, may be proportioned for a net allowable soil bearing pressure not to exceed 4000 pounds per square foot.

Fill material within the building and under the floor slab, not intended to support interior bearing walls, would only have to be compacted to 90% of the maximum Modified Proctor Dry Density, for floor loads which would not exceed 300 pounds per square foot. Exterior fill around the building should be compacted to at least 85% of the maximum Modified Proctor Dry Density, to minimize post construction settlements.

The factor of safety with respect to design of the foundations for building 5 should be in excess of 3. Settlement which may be expected should be less than 1/2 inch and differential settlement should be less than 1/2 this amount.

No excavation

Building No. 6 No boring was drilled at this specific building. The soil conditions for this structure are extrapolated from those found at borings 22, 4, and 16 (phase I investigation).

The finished first floor elevation for building 6 would be +195.7. Thus, since we recommend the use of a spread footing foundation for this building, footings supported 4 feet below final grade should be founded within the range of elevation of +190 to +191. These footings would probably be supported on naturally-occuring, non-organic, medium dense granular soils. As recommended for building 5, spread footings for building 6 should be proportioned for a net allowable soil bearing pressure not to exceed 4000 pounds per square foot, based on foundation subsoils consisting of naturally-occuring, non-organic, granular soils having a Standard Penetration value of at least 10 blows per foot. The factor of safety with respect to bearing for this design should be in excess of 3, and settlements should not exceed 1/2 inch.

Minimal excavation

Building No. 7 and 8 The soil conditions at the two buildings are defined by borings 1 and 2 of the original investigation. Finished first floor elevation for building 7 would be approximately +197; while for building 8, this elevation would be approximately +195. Thus, exterior finished grade would vary from approximately +196 in building 7, to +194 at building 8. Footings supported at frost depth at building 7 would be founded within the range of elevation of +191 to +192; and the footings would be founded at +190 to +191 for building 8. Based on borings 1 and 2, we anticipate that these footings would be supported on naturally-occuring, non-organic, medium dense granular soil. Spread footing foundations for these two buildings, supported on the soils described above, within the ranges of elevation given above, may also be proportioned for a net allowable soil bearing pressure not to exceed 4000 pounds per square foot.

Regarding the design of floor slabs for this building, please note that some buried organic topsoil was encountered near the surface at the location of boring 1. We recommend that any organic topsoils under the floor slabs of these buildings be removed and replaced with a select compacted granular backfill. This backfill should be compacted to at least 90% of the maximum Modified Proctor Dry Density.

No excavation

Building No. 9 The soil conditions at this building are described by boring 13 of the original investigation. This boring, which was drilled for a proposed parking area at the time, extended to a depth of 11.5 feet and disclosed approximately 3 feet of fill over medium dense naturally-occuring granular soil. Finished grade for this building would be +193.7. This is approximately the grade existing in this area at the time of the subsurface investigation. We do recommend the use of spread footing foundations for this building, supported at least 4 feet below final grade. Thus, the footings would be founded within the range of elevation of approximately +188 to +189, and should be supported on naturally-occuring, non-organic medium dense granular soils. Spread footings for this building, supported at normal frost depth on the soils described above, may be proportioned for a net allowable soil bearing pressure

not to exceed 4000 pounds per square foot. The factor of safety with respect to bearing for this design would be in excess of 3, and settlements which may occur to this structure should be less than 1/2 inch in both differential and total settlements.

The floor slab for this building may be cast directly on the non-organic granular fill soils which were found at the location of boring 38 or 13.

No excavation

Building No. 10 The soil conditions at this building are described by boring 12 of the original investigation, which was performed for a proposed parking pavement; and by boring 38 of the phase II investigation, which was extended to greater depth. Boring 38 disclosed fill material existing to approximately 4 feet, consisting of medium dense silty sand and brown fine sand. Underlying the fill material was naturally-occuring, medium dense granular soil, changing to a stiff gray-brown clayey silt at a depth of approximately 19 feet.

We recommend the use of a spread footing foundation for building 10. The spread footings should be supported at least 4 feet below final grade, and thus would likely be founded within the range of elevation of +188 to +189. The footings at this elevation would likely be supported on naturally-occuring, non-organic, well-graded brown sand. These spread footings may also be proportioned for a net allowable soil bearing pressure not to exceed 4000 pounds per square foot. The factor of safety with respect to bearing for this design would be in excess of 3, and total differential settlements for this building should not exeed approximately 1/2 inch.

No excavation

Garage No. 2 The soil conditions at garage number 2 are described in borings 29 and 30. These soil conditions consist of medium dense to loose sand and clay fill to depths on the order of 6 feet. In boring 29, the fill was underlain by stiff gray-brown and gray silty clay; while at boring 30, the fill material was underlain by soft to stiff black silty clay containing a trace of organic matter. This black silty clay was found to have a relatively low moisture content, and therefore, we anticipate that it would not be extremely compressible. Since the proposed structure

at this location is to be a lightly loaded frame garage, with a slab-on-grade at approximately elevation +190.3, we are of the opinion that the building could be successfully supported on spread footing foundations, without having to remove all of the black silty clay. A slight amount of fill, on the order of 12 inches in thickness, would have to be placed in this area to raise the grade to final elevation.

The footings for this building should be supported at least 4 feet below final grade, and would likely be found within the range of elevation of +185 to +186. These footings would be supported on the existing brown fine to coarse sand at boring 29, or on the clay fill at boring 30. These footings may be proportioned for a net allowable soil bearing pressure not to exceed 1500 pounds per square foot. Total settlement which may occur to this structure may be 3/4 to 1 inch, while differential settlement should be less than 1/2 this amount. However, as mentioned above, we are of the opinion that the proposed building for this location should be able to tolerate this type of settlement. If it is decided that this amount of settlement is undesireable, we recommend that the footings be extended deeper, through the black silty clays found at boring 30, to bear on the underlying non-organic soils encountered at about 6 feet.

The floor slab for this building should not experience detrimental settlements due to consolidation of the existing fill. The amount of load which the floor slab would add to the existing fill should not be excessive. However, we do recommend that appropriate construction joints be cast into the slab so that differential settlement does not cause random cracking.

Pavement Areas For the design and construction of pavements, the recommendations contained in this report for floor slabs on grade, regarding removal of existing fill, underlying topsoil and organic soils, inspection , placement of new fill and compaction are applicable. In addition, however, we recommend that any subgrade fill material placed for exterior pavements be a select granular soil having less than 8% passing a number 200 sieve. A recommended gradation for this material is included in the

Appendix of this report. In areas where heavy wheel loads are anticipated, we recommend that the subgrade fill material be compacted to a minimum of 95% of the maximum dry density according to ASTM D-1557-70.

In the southern parking lot area, some post-construction settlement of the pavements can be anticipated, due to the presence of the compressible organic soil which underlies the area. It is probably the most economical choice to leave these materials in place. This settlement will occur due to the weight of additional fill to be placed in this area, and other loads which may be imposed upon the pavement. This settlement may amount to a few inches and could be expected to occur over a period of several years. It is likely that maintenance consisting of patching and releveling the pavements through the years will be less expensive than completely overexcavating the unsuitable underlying soils and replacing with a properly compacted fill in order to avoid settlement.

One major problem which may occur related to the settlement of the parking lot would be that if storm sewer lines are incorporated into the design in order to drain the pavements, these lines may become damaged or broken due to settlement and thus cause larger maintenance and repair costs to develop. It may be more beneficial to properly slope the parking lot in order to avoid such problems. In addition, manholes should be supported on non-compressible soils below the organics. The pavement should be properly graded to maintain positive flow into the manholes.

We would be pleased to be of further service to you in providing additional recommendations for the design of the project pavements if furnished with more specific information regarding loading, usage, and frequency of load application. As a general recommendation, we are of the opinion that a bituminous pavement is the most feasible. However, we recommend the use of rigid concrete pavement for the garage floors and aprons. In any event, we recommend that the design of the project pavements incorporate facilities for proper drainage. Where standing water develops on the pavement surface, or within a base course layer, softening of the subgrade due to freeze/thaw conditions and general deterioration of the pavement can be expected.

POTENTIAL CONSTRUCTION PROBLEMS

We anticipate that the ground water table may be encountered in excavations extending to depths on the order of 15 feet below the existing grade, during removal of unsuitable soils. However, we are of the opinion that the amount of water should not be extreme, and that water which would seep in from the ground water table, from perched ground water conditions, or from surface runoff in the area, can be removed by means of standard sump pit and pump operations. We do recommend that any water standing on foundation soils or on a subgrade over which additional fill is to be placed, be removed as soon as possible to prevent softening of the soil. Any soils which are loosened or disturbed during the excavation, should be recompacted to at least the initial density prior to placement of any fill or foundation construction. Furthermore, concrete for footings should not be placed directly into standing water. Rather, such water should be removed prior to concrete placement.

In the design of the project, care should be exercised at the location of the utility lines which connect the buildings with the municipal systems. The location of the lines in some areas may be underlain by compressible organic soils. Routing of lines through this area should be avoided if possible. The reason for this is to minimize differential settlement which may occur between the structures and utility lines. Such settlement could result in distress to the lines and interuption of service. If the lines are routed through organic soils in some areas, it may be necessary to support the lines on piles, in which case the settlement of the lines would not be anticipated. However, where pile-supported utility lines may go under paved parking areas where settlement may occur, this may result in bumps or high spots in the paved area.

We recommend that areas to be paved be test rolled, in accordance with Minnesota Highway Specification Section 2111, to detect areas of loose or unstable soil. Where test rolling is used for paved areas, care should be exercised to avoid the use of construction equipment which is excessively heavy. Where excessively heavy equipment

is used, this may cause undue disturbance of the subgrade, especially if the subgrade is saturated at the time of the test rolling. In any event, we recommend that all of the test rolling be observed by an experienced Soil Engineer in order to evaluate the results of the test rolling procedures.

Sidewalls of excavations for this project must be either adequately sloped, or sheeted and braced, in accordance with pertinent OSHA Regulations in order to provide safe working conditions for personnel in the excavations. It is the responsibility solely of the Contractor to comply with such regulations as they pertain to foundation construction and earthwork operations for this site. Excavation to, into, and through buried organic soils at this site must be properly vented, to prevent possible buildup of toxic, noxious, or flammable gases which may occur due to anaerobic decomposition of the buried organic soils. Extreme caution should be exercised if personnel are to enter narrow trenches for work, to prevent them from being overcome by such gases.

During exterior paving operations, we recommend that the final placement of the bituminous materials be accomplished only when the subgrade and base course are within the optimal range of moisture content. That is, we recommend that if subgrade is prepared, and becomes saturated and/or weakened due to rainfall or freeze/thaw conditions prior to placement of the bituminous wearing surface, the paving should be delayed until such time as the subgrade strength is restored.

GENERAL QUALIFICATIONS

This report has been prepared based on information received from the Owner, St. Louis Park Housing & Redevelopment Authority; and the Architect, Miller, Hansen, Westerbeck, Bell, as well as on the soil and ground water conditions revealed in the two phases of the subsurface exploration performed at this site. The purpose of this report is to aid in the evaluation of the soil and ground water conditions at this site, and to assist the Architect and Owner in the design of the project based on our understanding of the project requirements. If there are any changes in the size, scope, elevations, structural loads, use or nature of the proposed buildings, from

those conditions stated in this report, we ask that we be advised of these changes as soon as possible in order that we may have the opportunity to review our recommendations and determine if they remain applicable.

As noted in the soil borings and as described in the text of this report, buried layers of organic soil, consisting of topsoil, peat, organic clay, and soft silty clay layers were encountered at this site. We definitely recommend that spread footing foundations not be supported over these soils, or over additional fill placed over these soils. Rather, deep foundations are recommended for these areas; or alternatively, overexcavation of organic soils and soft soils, and replacement with a properly compacted backfill should be used where feasible.

We urge that all foundation construction and site preparation work at this project be inspected by an experienced Soil Engineer to ascertain that the soil conditions at and below the foundations are as anticipated in this report. This is especially true in areas where buried organic soils were not disclosed, yet where the possibility of these organic soils existing is known.

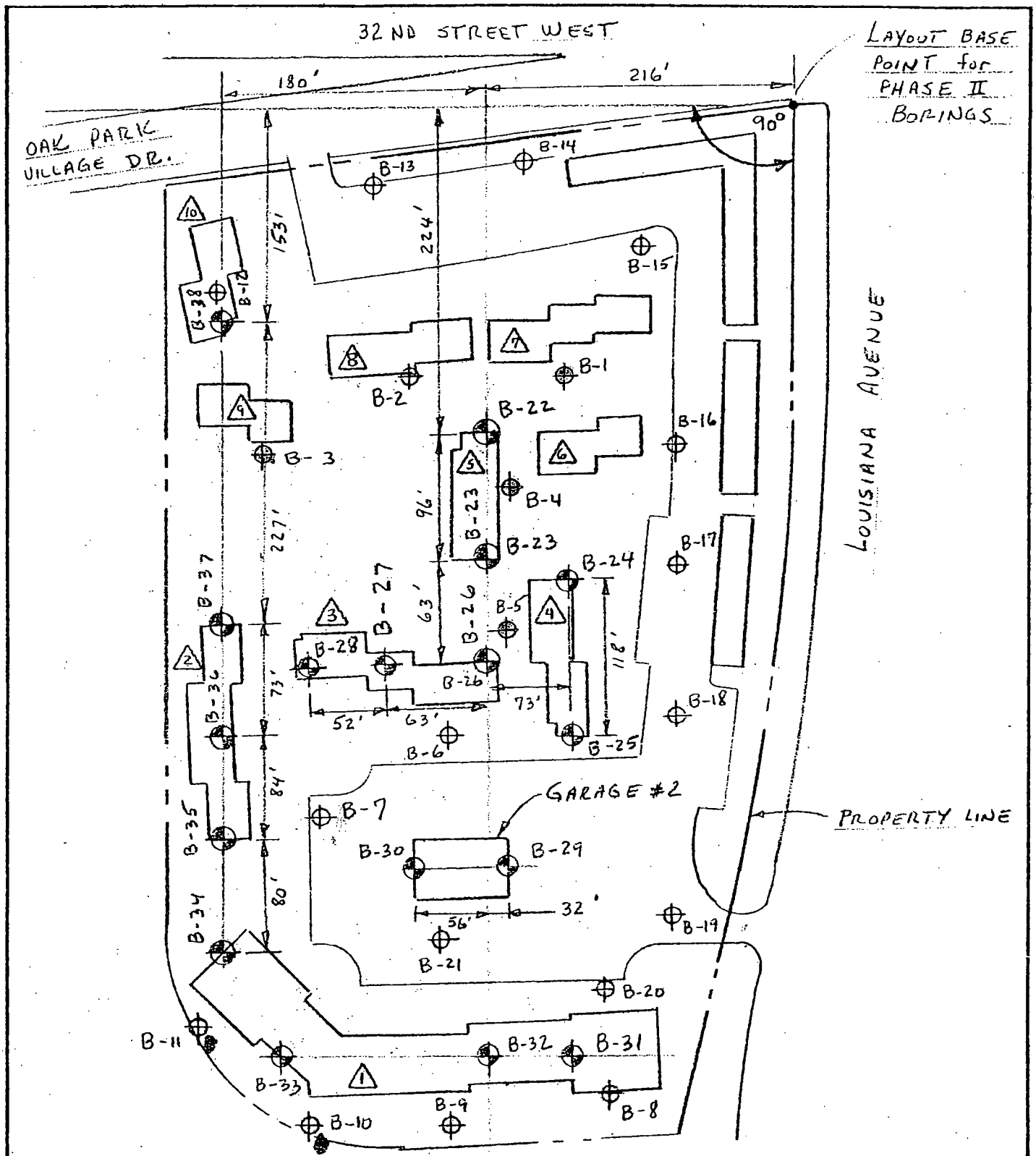
Where compacted backfill is utilized under pavements, floor slabs, or footings, we strongly recommend that testing of the in-place density of the fill be made at the time of construction. This would include having a Soil Engineer or Soil Technician perform in-place field density tests. The satisfactory performance of structures and pavements supported over compacted fill is dependent upon placement of the fill over a suitable subgrade of non-organic, undisturbed, non-compressible soil. Furthermore, the fill materials must be compacted in a uniform manner to the minimum densities recommended in this report.

The soil and ground water conditions at this site have been determined at a total of thirty-eight (38) soil boring locations. The soil and ground water conditions described herein, are pertinent only at the soil boring locations, and under the environmental conditions existing at the time of the subsurface exploration. Variations, including some extreme variations, were noted in the soil conditions at different borings. Further variations may exist which could not be detected at the soil borings

or during the site inspection by the writer. Further, we cannot predict future environmental changes which may occur at this site, such as construction of adjacent foundations, possible spillage of chemicals which may attack the soil, artificially regulated lowering or raising of the ground water table and so on. Therefore, no other warranty, either expressed or implied, is presented in this report with respect to the soil and ground water conditions at this site.

APPENDIX

1. Soil Boring Location Diagram
2. Summary of Building Finished Floor Grades
3. General Notes
4. Soil Boring Logs
5. ASTM Specification D-1586-67
6. Unified Soil Classification Chart
7. Recommended Gradation for Select Granular Backfill Under Structures and Pavements



△ BUILDING #

⊕ PHASE I BORING

⊕ PHASE II BORING

THIS LAYOUT DIAGRAM TRACED FROM M-H-W-B 8½" x 11" PLAN DATED 7-26-77. BORING DIMENSIONS SCALED FROM FULL SIZE SITE PLAN + SITE SURVEY

Soil Boring Location Diagram
Oak Park Village
St. Louis Park, Minnesota

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

WCK	8-31-77	1" ≈ 100'	90920-B

STS Job No. 90920-B
Oak Park Village
St. Louis Park, Minnesota

SUMMARY OF BUILDING FINISHED FLOOR GRADES & BORING LOCATIONS

Building No.	Pertinent Borings	Finished Floor Slab Grade
1	8, 9, 10, 11, 31 32, 33, 34	+194.3 (east end) +187.3 (west end)
2	35, 36, 37	+189.7 (north end) +188.3 (south end)
3	5, 6, 26, 27, 28	+192.7 (east end) +191.3 (west end)
4	5, 24, 25	+193.7
5	4, 22, 23	+198.6
6	16, 22	+195.7
7	1	+196.7 (west end) +197.3 (east end)
8	2	+195.0 (west end) +195.6 (east end)
9	13	+193.7
10	12, 38	+194.66
Garage #2	29, 30	+190.3
Garages in N.E. Corner	14, 15, 16, 17, 18	+199.0

GENERAL NOTES

DRILLING & SAMPLING SYMBOLS:

SS : Split Spoon – 1 3/8" I.D., 2" O.D., unless otherwise noted
ST : Shelby Tube – 2" O.D., unless otherwise noted
PA : Power Auger
DB : Diamond Bit – NX: BX: AX
AS : Auger Sample
JS : Jar Sample
VS : Vane Shear
OS : Osterberg Sampler – 3" Shelby Tube
HS : Hollow Stem Auger
WS : Wash Sample
FT : Fish Trail
RB : Rock Bit
BS : Bulk Sample
PM : Pressuremeter test - in situ

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level
WCI : Wet Cave In
DCI : Dry Cave In
WS : While Sampling
WD : While Drilling
BCR : Before Casing Removal
ACR : After Casing Removal
AB : After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence of ground water elevations must be sought.

GRADATION DESCRIPTION & TERMINOLOGY:

Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays or clayey silts if they are cohesive, and silts if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency, and their plasticity.

Major Component Of Sample	Size Range	Descriptive Term(s) (Of Components Also Present in Sample)	Percent of Dry Weight
Boulders	Over 8 in. (200mm)	Trace	1 – 9
Cobbles	8 in. to 3 in. (200mm to 75mm)	Little	10 – 19
Gravel	3 in. to #4 sieve (75mm to 2mm)	Some	20 – 34
Sand	#4 to #200 sieve (2mm to .074mm)	And	35 – 50
Silt	Passing #200 sieve (0.074mm to 0.005mm)		
Clay	Smaller than 0.005mm		

CONSISTENCY OF COHESIVE SOILS:

Unconfined Comp. Strength, Qu, tsf	Consistency
< 0.25	Very Soft
0.25 – 0.49	Soft
0.50 – 0.99	Medium (Firm)
1.00 – 1.99	Stiff
2.00 – 3.99	Very Stiff
4.00 – 8.00	Hard
>8.00	Very Hard

RELATIVE DENSITY OF GRANULAR SOILS:

N – Blows/ft.	Relative Density
0 – 3	Very Loose
4 – 9	Loose
10 – 29	Medium Dense
30 – 49	Dense
50 – 80	Very Dense
80+	Extremely Dense

LOG OF BORING NO. B-1 (page 1 of 2)

OWNER
St. Louis Park Housing Authority

ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.

SITE 32nd Street West & Louisiana Avenue
St. Louis Park, Minnesota

PROJECT NAME
Oak Park Village

SURFACE ELEVATION 198.3

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	"N"
	1	SS		Brown silty fine to coarse sand and gravel fill - damp - frozen - (SM-SW)		
	2	SS		Black silty organic sand topsoil - damp - frozen - (OL-SM)		
5.0	3	SS		Brown & dark brown fine to coarse sand, trace gravel - damp - frozen to 3.5 feet - medium dense - (SP-SW		15
	4	SS		Brown fine sand, trace silt - moist - medium dense - (SM-SP)		10
10.0	5	SS				15
15.0	6	SS		Brown fine to coarse sand, trace gravel - moist to wet - medium dense - (SW)		16
20.0	7	SS				21
25.0	8	SS		Brown fine to coarse sand, trace gravel - saturated - medium dense - (SW) - slight to strong creosote odor		18
30.0	9	SS				27
				(continued on next page)		

WATER LEVEL OBSERVATIONS
W.L. 21.5' WD
W.L. 5.0' B.C.R. DCI 17' A.C.R.
W.L. DCI 15' 6 days AB

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

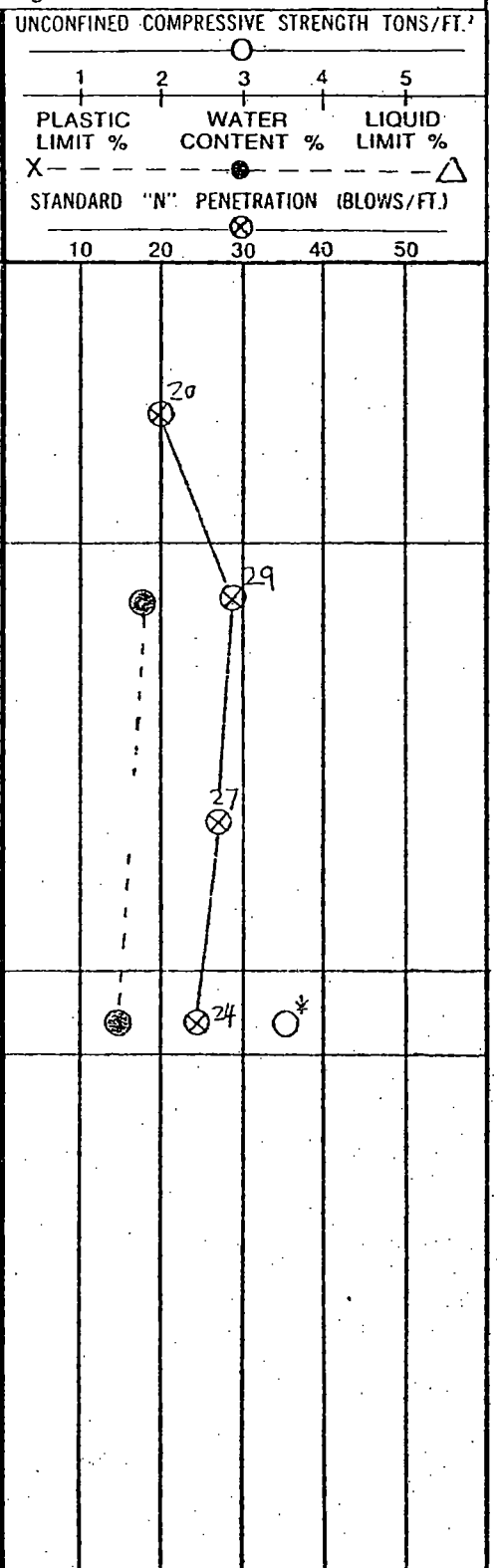
BORING STARTED 1-25-77
BORING COMPLETED 1-25-77
RIG B-50 FOREMAN HH
DRAWN JO APPROVED JO
JOB # 90920 SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual

LOG OF BORING NO. B-1 (page 2 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					(continued from previous page) SURFACE ELEVATION ▽	
35.0	10	SS			Brown fine to coarse sand, trace gravel - saturated - medium dense - (SW)	
40.0	11	SS			Gray silty fine to medium sand, trace gravel - saturated - medium dense - (SM) - strong to slight creosote odor	
45.0	12	SS				
50.0	13	SS			Red brown silty & sandy clay - trace gravel - very stiff - (CL-SC)	
					End of Boring 3¼" ID Hollow stem auger casing used full depth. Drilling mud used after sampling at 30 feet depth. ○* - Calibrated Penetrometer	



WATER LEVEL OBSERVATIONS		
W.L.	21.5' WD	
W.L.	5.0' B.C.R.	DCI 17' A.C.R.
W.L.	DCI 15' 6 days AB	
W.L.		

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-25-77
BORING COMPLETED	1-25-77
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. B-2

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 196.4	
	1	SS			Brown, dark brown & black silty fine to coarse sand fill - moist - frozen to 2 foot depth - (SM-SW)	
	2A	SS				
	2	SS				
5.0	3	SS				
	4	SS				
10.0	5	SS			Brown fine to medium sand, trace silt - moist - medium dense - (SP)	
15.0	6	SS				
20.0	7	SS			Brown fine to coarse sand, trace gravel - saturated - medium dense - (SW)	
25.0						
26.5	8	SS				
					End of Boring	
30.0					3¼" ID Hollow stem auger casing used full depth	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²

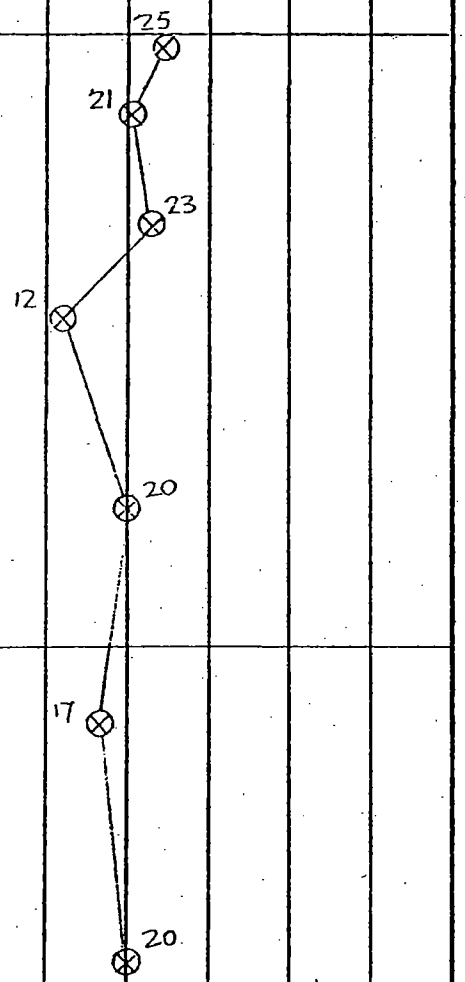
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

X — — — — — ● — — — — — △

STANDARD "N" PENETRATION (BLOWS/FT.)

10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	20.5' WD	
W.L.	20.5' B.C.R.	DCI 13' A.C.R.
W.L.	DCI 9.2' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-25-77	
BORING COMPLETED 1-25-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

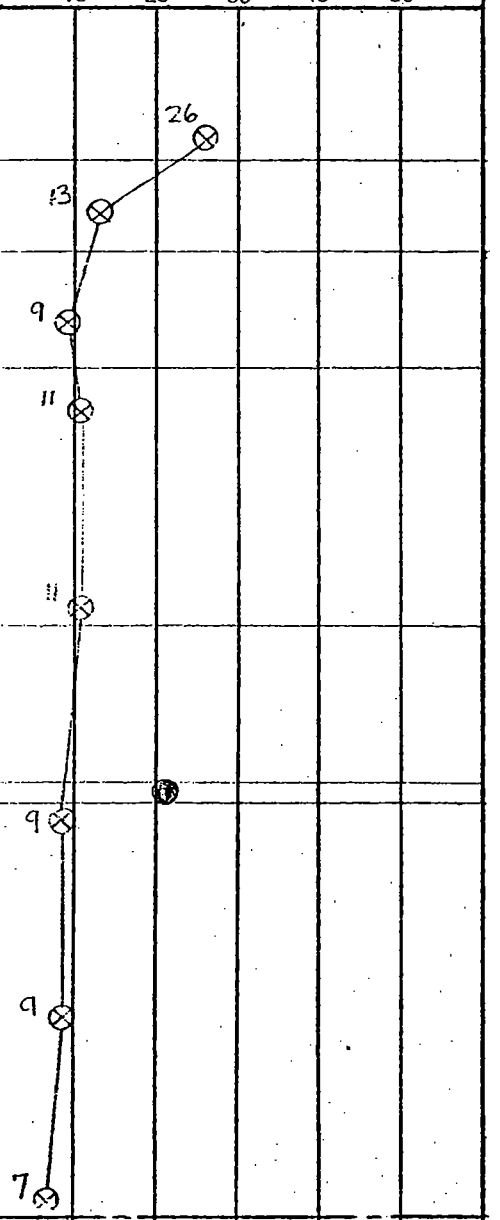
BBS41576

LOG OF BORING NO. B-3 (page 1 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 194.2	
	1	PA			Dark brown slightly organic silty fine to coarse sand fill, trace fine gravel - moist - frozen to 3.0 feet - (SM-OL)	
	2	SS				
5.0	3	SS			Brown fine to coarse sand, trace gravel & silt - moist - medium dense - (SW)	
	4	SS			Brown fine to medium sand, trace silt - moist - loose - (SP-SM)	
10.0	5	SS			Brown fine to coarse sand, trace silt & gravel - moist - medium dense - (SW)	
15.0	6	SS				
	7	SS			Gray-brown fine to medium sand, trace silt & gravel - saturated - loose - (SP-SM)	
20.0	7B	SS			Gray silty very fine sand - saturated - loose - (SM)	
25.0	8	SS			Gray-brown fine to coarse sand, trace gravel - saturated - loose to medium dense - (SW) - strong creosote odor to 45 foot depth	
30.0	9	SS				
					(continued on next page)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	18.0' WD	
W.L.	17.5' B.C.R.	A.C.R.
W.L.	WCI 19.5' A.C.R.	
	DCI 13.0' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-25-77	
BORING COMPLETED 1-25-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. B-3 (page 2 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
30.0					(continued from previous page) SURFACE ELEVATION	
35.0	10	SS			Gray-brown fine to coarse sand, trace gravel - saturated - loose to medium dense - (SW) - strong creosote odor to 45 foot depth	
40.0	11	SS				
45.0	12	SS				
50.0	13	SS				
					End of Boring 3¼" ID Hollow stem auger casing used full depth. Drilling mud used after sampling at 20 foot depth.	

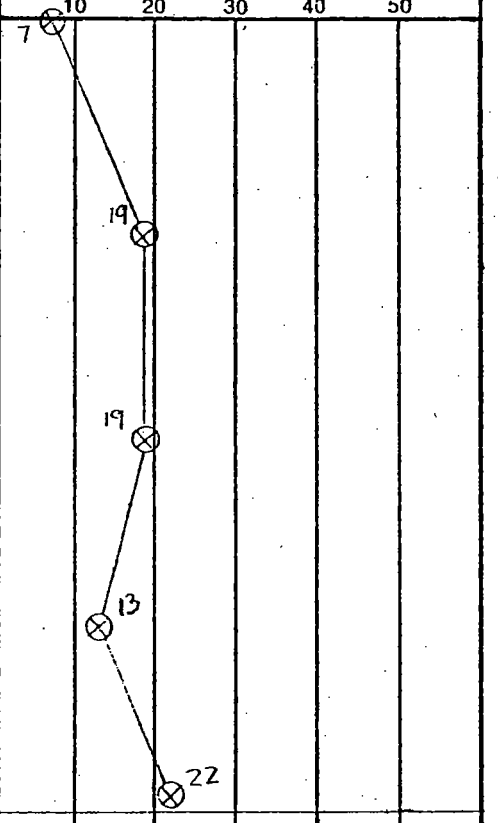
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²

1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %

STANDARD "N" PENETRATION (BLOWS/FT.)

10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	18.0' WD	
W.L.	17.5' B.C.R.	A.C.R.
W.L.	WCI 19.5' A.C.R.	
	DCI 13.0' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-25-77	
BORING COMPLETED 1-25-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

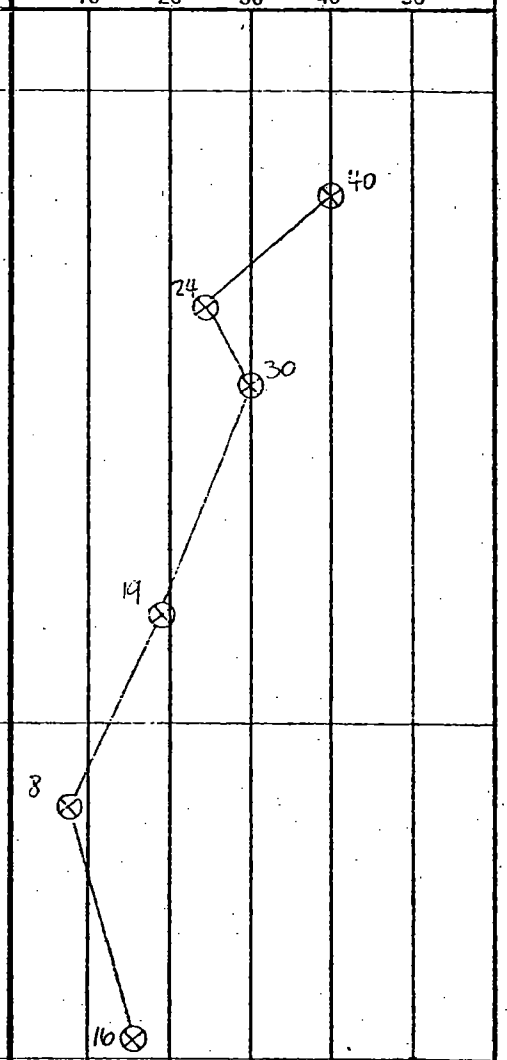
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-4

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Avenue West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 195.2	
	1	PA			Dark brown silty fine to medium sand fill - moist - frozen - (SM) - fill	
	1A	SS				
5.0	2	SS				
	3	SS			Brown fine to coarse sand, trace gravel & silt - moist - dense to medium dense - (SW)	
10.0	4	SS				
15.0	5	SS				
20.0	6	SS			Gray fine to coarse sand, trace gravel & silt - saturated - loose to medium dense - (SW) - strong creosote odor	
25.0						
26.5	7	SS				
					End of Boring Hollow stem auger casing used full depth.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	19.0' WD	
W.L.	19.0' B.C.R.	17.8' A.C.R.
W.L.	WCI 18.0' A.C.R.	
	DCI 17.0' 5 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-26-77	
BORING COMPLETED 1-26-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

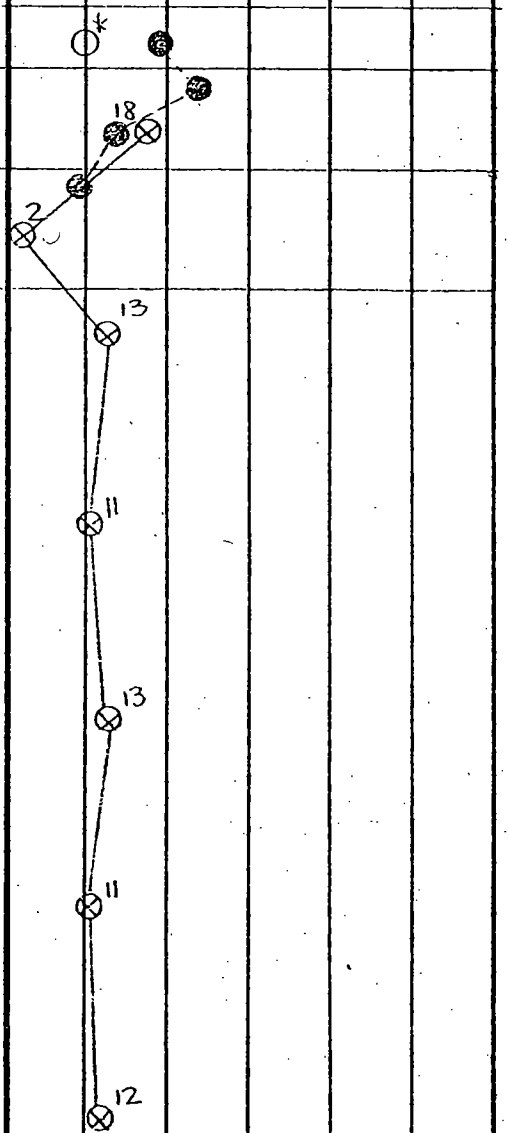
RRS 41576

LOG OF BORING NO. B-5 (page 1 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 193.2	
	1	PA			Black silty organic sand topsoil - moist - frozen - (OL-SM)	
	2	SS			Brown silty clay, trace sand - stiff - frozen - (CL) fill	
	2A	PA				
5.0	3	SS			Black & dark brown silty slightly organic sand fill - moist - medium dense - (OL-SM)	
	3A	PA				
	4	SS			Brown fine to medium sand, trace coarse sand, trace silt - moist - very loose - (SP-SM)	
10.0	5	SS				
15.0	6	SS				
20.0	7	SS			Brown fine to coarse sand, changing to gray at 20 foot depth, trace gravel & silt - moist to saturated below 20 feet - medium dense - (SW)	
25.0	8	SS			creosote odor 19 feet to 30 feet	
30.0	9	SS				
					(continued on next page)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	19.0' WS	
W.L.	19.0' B.C.R.	17.3' A.C.R.
W.L.	WCI 17.5' A.C.R.	
	DCI 16.2' 4 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-27-77	
BORING COMPLETED 1-27-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

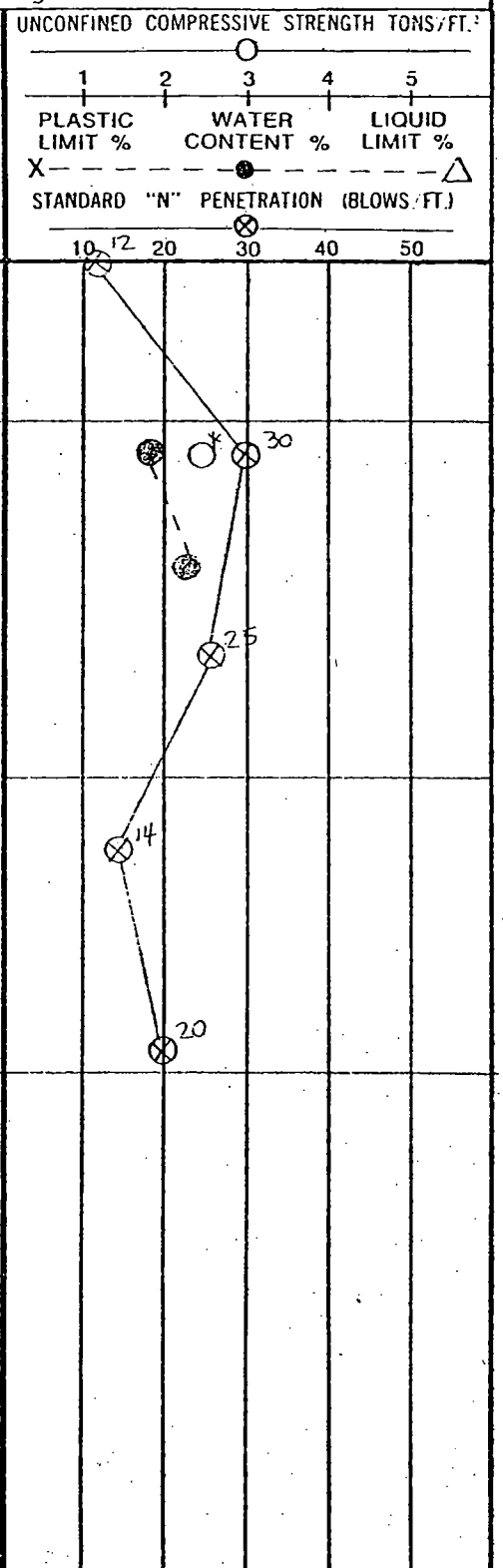
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

B8S41576

LOG OF BORING NO. B-5 (page 2 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				(continued from previous page)	
30.0				SURFACE ELEVATION	
				Brown fine to coarse sand, changing to gray at 20 foot depth, trace gravel & silt - moist to saturated below 20 feet - medium dense - (SW) creosote odor 19 feet to 30 feet	
35.0	10	SS			
	10A	PA		Brown-gray & slightly red fine sand, trace silt - saturated - medium dense - (SM-SP)	
40.0	11	SS			
45.0	12	SS		Gray-brown fine coarse sand, trace silt - saturated - medium dense - (SW)	
50.0 / 50.5	13	SS			
				End of Boring 3¼" ID Hollow stem auger casing used full depth. Drilling mud used after sampling at 20 foot depth. O* - Calibrated Penetrometer	



WATER LEVEL OBSERVATIONS		
W.L.	19.0' WS	
W.L.	19.0' B.C.R.	17.3' A.C.R.
W.L.	WCI 17.5' A.C.R.	
	DCI 16.2' 4 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-27-77	
BORING COMPLETED 1-27-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

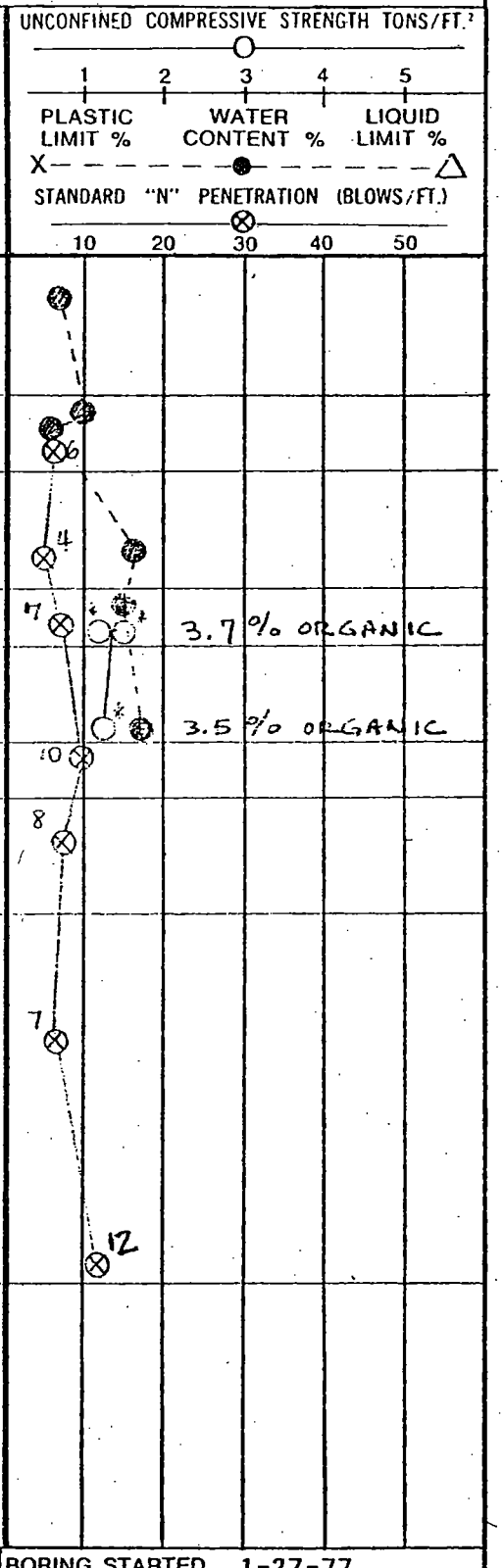
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. B-6

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				SURFACE ELEVATION 192.8	
	1	PA		Dark brown to black silty sand fill, slightly organic - damp - frozen - (OL-SM)-fill	
	2	SS			
5.0	3	SS		Brown fine to coarse sand, trace gravel - moist - loose - (SW-SM) fill	
	4	SS		Brown clayey fine to coarse sand fill, trace gravel - moist - (SC-SW) fill	
	4A	PA		Black organic fibrous clayey silt - (OL)	
10.0	5	SS			
	5A	PA		Dark gray silty clay - stiff - (CL-CH)	
	6	SS			
	6A	SS		Gray brown fine to medium sand, trace clay, trace fine gravel - wet - medium dense - (SC)	
15.0	7	SS		Gray brown fine to medium sand, trace silt & fine gravel - wet - loose - (SM)	
20.0	8	SS		Gray-brown fine to coarse sand, trace silt & gravel - saturated - loose to medium dense - (SW)	
25.0					
26.5	9	SS			
30.0				End of Boring 3¼" ID Hollow stem auger casing used full depth ○* - Calibrated Penetrometer	



WATER LEVEL OBSERVATIONS		
W.L.	18.5' WD	
W.L.	19.5' B.C.R.	16.8' A.C.R.
W.L.	WCI 17.0' A.C.R.	
	DCI 16.0' 4 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-27-77
BORING COMPLETED	1-27-77
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

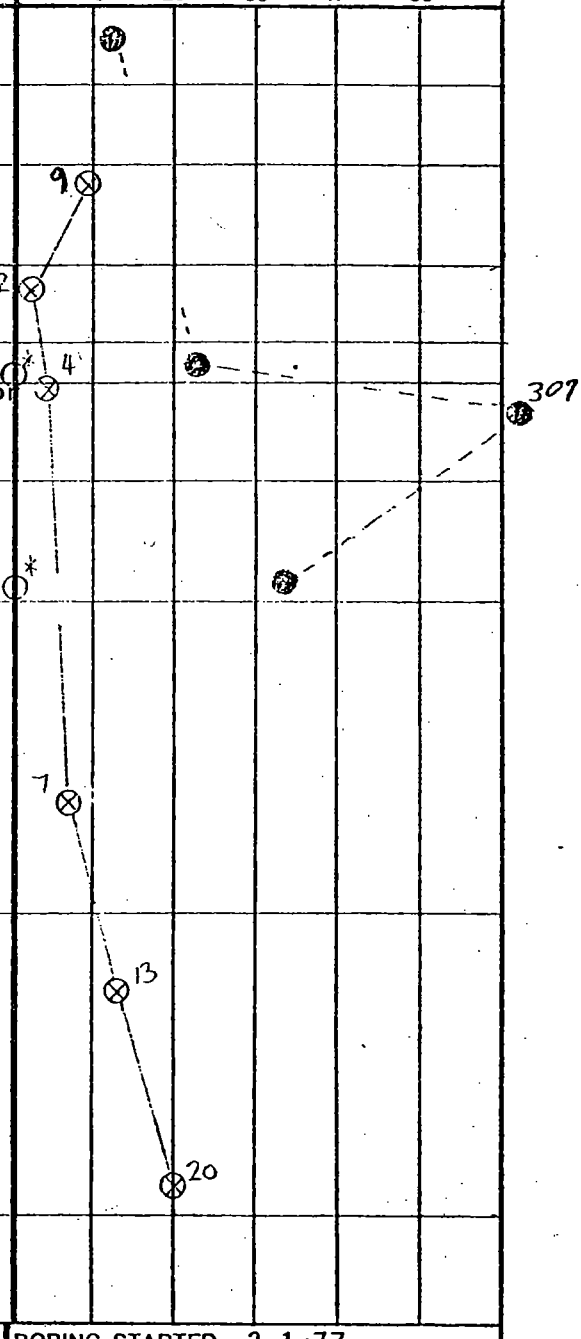
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-7 (page 1 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				SURFACE ELEVATION 190.6	
	1	PA		Brown sandy clay fill - moist - (CL) - slight creosote odor	
	2	SS		Brown silty fine to medium sand fill - very dense - moist - (SM)	
5.0	3	SS		Brown fine to medium sand fill - loose - moist - (SP)	
	4	SS		Brown fine to medium sand fill with a little gray sandy silt - very loose - moist - (SP) - slight creosote odor	
	5	SS		Grayish brown clayey silt fill - very soft - wet - (ML) - moderate creosote odor	
10.0	5A	SS		Dark brown to black fibrous peat - soft - wet - (Pt) - moderate creosote odor	
				Gray clayey silt - very soft - wet - (ML) - slight creosote odor	
15.0	6	SS			
	6A	SS			
				Gray fine to medium sand with a trace of gravel - medium dense - saturated - (SP)	
20.0	7	SS			
25.0	8	SS		Brown fine to medium sand with a little trace of gravel - medium dense - saturated - (SP) - slight creosote odor	
30.0	9	SS			
				(continued on next page)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS			
W.L.	16' WD		
W.L.	7' B.C.R.	14.5' A.C.R.	
W.L.	WCI 16' AB		
	frozen to 3.5'		

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 2-1-77	
BORING COMPLETED 2-1-77	
RIG B-50	FOREMAN HH
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

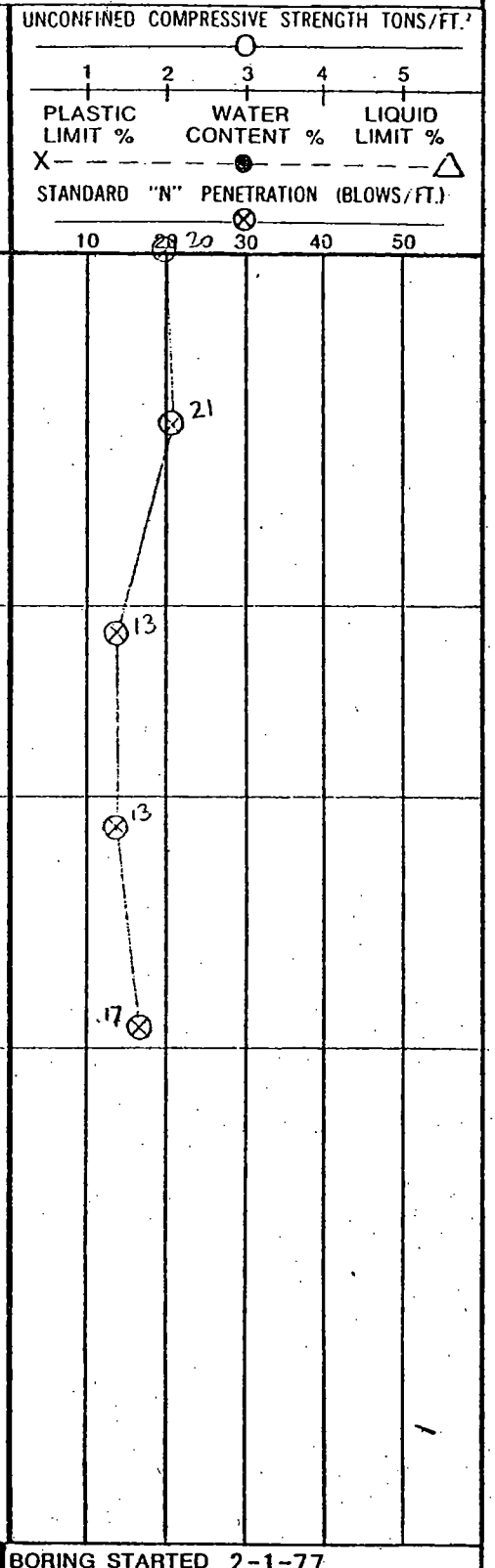
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

RRS41576

LOG OF BORING NO. B- 7 (page 2 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					(continued from previous page)	
30.0					SURFACE ELEVATION	
35.0	10	SS			Brown fine to medium sand with a little trace of gravel - medium dense - saturated - (SP) - slight creosote odor	
40.0	11	SS			Brown fine to coarse sand with some gravel - medium dense - saturated - (SP)	
45.0	12	SS			Grayish brown medium to coarse sand medium dense - (SP)	
50.0	13	SS			End of Boring Hollow stem auger used to full depth ○* - Calibrated Penetrometer	



WATER LEVEL OBSERVATIONS		
W.L.	16' WD	
W.L.	7' B.C.R.	14.5' A.C.R.
W.L.	WCI 16' AB	
	frozen to 3.5'	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 2-1-77	
BORING COMPLETED 2-1-77	
RIG B-50	FOREMAN HH
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BRS41576

LOG OF BORING NO. B-8 (page 1 of 2)

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION 190.7

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT. 3
					Concrete	
	1	SS			Brown medium to coarse sand - medium dense - damp - (SP)	
5.0	2	SS			Brown fine to coarse sand with some gravel - medium dense - moist - (SP)	
	3	SS				
	4	SS				
10.0						
	5	SS			Brown fine sand - medium dense - moist - (SP)	
	6	SS				
15.0						
	7	SS			Brown fine to medium sand - loose - wet - (SP)	
20.0						
	8	SS			Brown fine to medium sand with some gravel - medium dense - wet - (SP)	
25.0						
30.0	9	SS			Brown fine sand - loose - saturated (SP)	

(continued on next page)

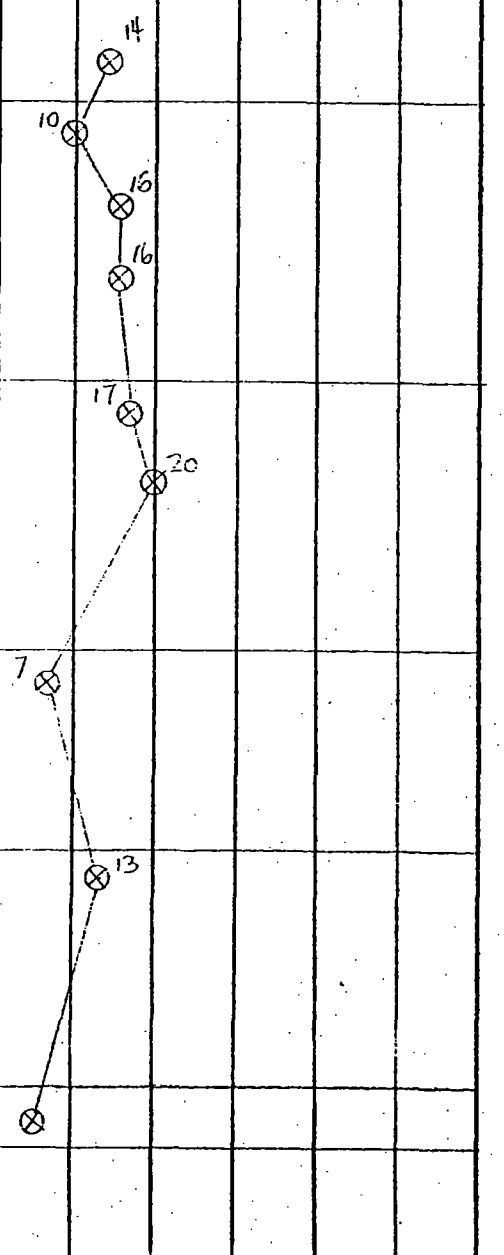
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²

1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

STANDARD "N" PENETRATION (BLOWS/FT.)

10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	17.5' WD	
W.L.	16.0 B.C.R.	A.C.R.
W.L.	WCI 16.5' AB	
WL	DCI 15' 3 hrs. AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 2-1-77	
BORING COMPLETED 2-1-77	
RIG B-40	FOREMAN PS
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

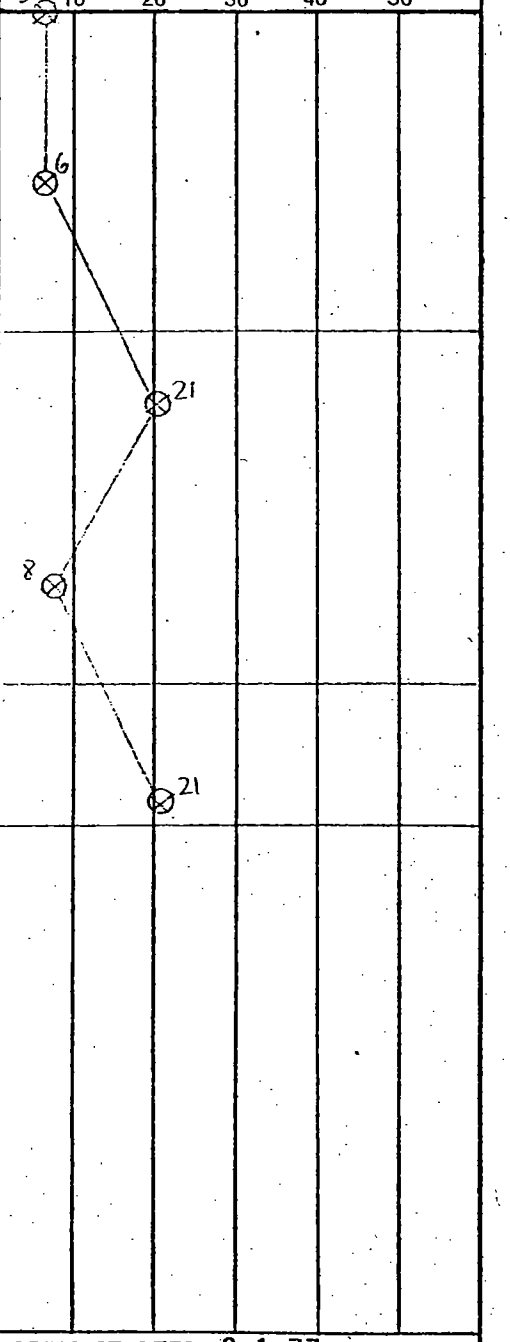
B8S41576

LOG OF BORING NO. B-8 (page 2 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				(continued from previous page)	
30.0				SURFACE ELEVATION	
				Brown fine sand - loose - saturated (SP)	
35.0	10	SS			
				Brown medium to coarse sand with some gravel - loose - saturated - (SP)	
40.0	11	SS			
45.0	12	SS			
				Brown fine sand - medium dense - saturated - (SP)	
50.0 50.5	13	SS			
				End of Boring Hollow stem auger used from 28 feet to termination depth	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
5 10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	17.5' WD	
W.L.	16.0 B.C.R.	A.C.R.
W.L.	WCI 16.5' AB	
	DCI 15' 3 hrs. AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 2-1-77	
BORING COMPLETED 2-1-77	
RIG B-40	FOREMAN PS
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

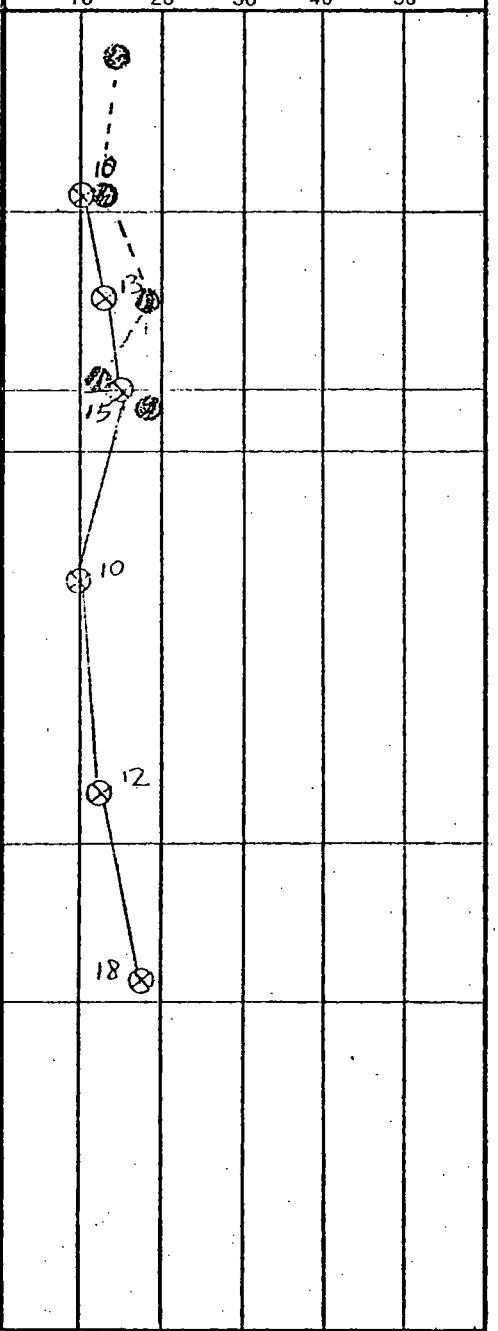
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BRS41576

LOG OF BORING NO. B-9

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Avenue West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 188.8	
	1	PA			Medium dark brown fine to coarse sand fill - some silt - trace gravel clay lumps - moist - frozen to 3 foot depth - medium dense - (SM-SC) fill	&
	1A	SS				
5.0	2	SS				
	3	SS			Black organic silty sand topsoil - wet - medium dense - (OL-SM) - slight creosote odor to 8 foot depth	
	4	SS				
10.0	4A	SS			Gray & slightly brown silty & clayey sand - wet - medium dense - (SC-SM)	
15.0	5	SS			Gray brown fine to medium sand - trace silt & gravel - saturated - medium dense - (SP-SM)	
20.0	6	SS				
					Brown fine to coarse sand - trace silt & gravel - saturated - medium dense - (SW)	
25.0	7	SS				
					End of Boring Solid stem auger used full depth	



WATER LEVEL OBSERVATIONS		
W.L.	17.0' WD	
W.L.	B.C.R.	A.C.R.
W.L.	17.0' A.B. 0 hr.	
	WCI 22.0' A.B.	
	DCI 12' 5 days A.B.	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-26-77	
BORING COMPLETED 1-26-77	
RIG B-40	FOREMAN CSB
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. B-10 (page 1 of 2)

OWNER
St. Louis Park Housing Authority

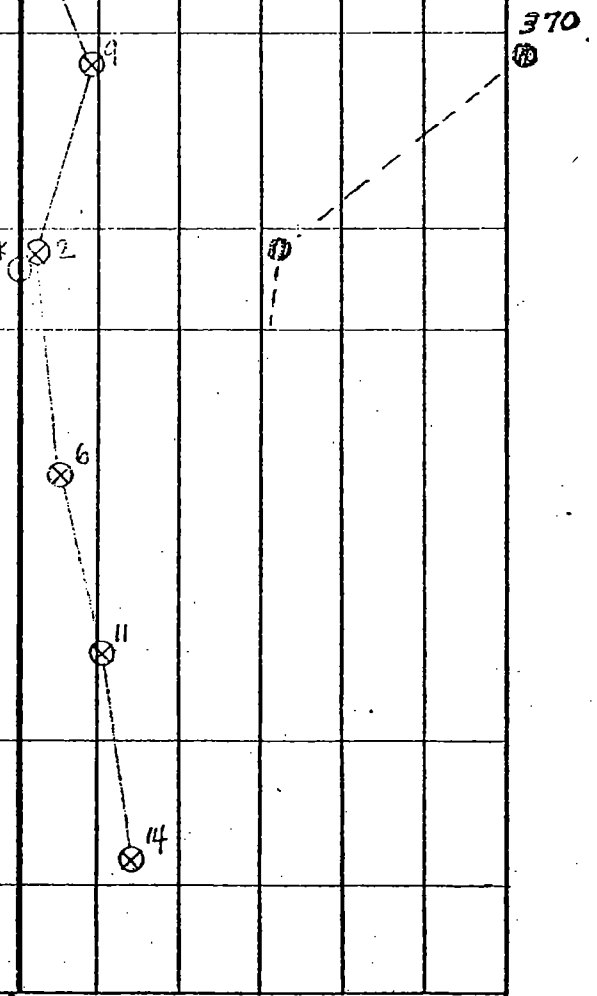
ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.

SITE 32nd Street West & Louisiana Avenue
St. Louis Park, Minnesota

PROJECT NAME
Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				SURFACE ELEVATION 188.3	
	1	SS		Brown fine to medium sand with a little gravel fill - moist - (SP) - moderate creosote odor	
5.0	2	SS		Gray fine to medium sand with a trace of gravel fill - loose -	
	3	SS		wet - (SP) - moderate creosote odor	
10.0	4	SS		Black fibrous and decomposed peat - moist - soft - (Pt)	
15.0	5	SS		Gray silt with a little sand - very soft - wet - (ML)	
20.0	6	SS		Gray fine to coarse sand with a little gravel - loose - wet - (SP)	
25.0	7	SS			
30.0	8	SS		Brown fine to medium sand with a little gravel - medium dense - wet - (SP)	
				(continued on next page)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS

W.L.	5.5' WD	
W.L.	7.0' B.C.R.	7.0' A.C.R.
W.L.	WCI 7.5' AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	2-1-77
BORING COMPLETED	2-1-77
RIG B-50	FOREMAN HH
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-10 (page 2 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
30.0					SURFACE ELEVATION	
35.0	9	SS			Brown fine to medium sand with a little gravel - loose - wet - (SP)	
40.0	10	SS				
45.0	11	SS			Brown fine to medium sand with a 4" layer of sandy to clayey silt at 49.0' - medium dense - wet - (SP)	
50.0 50.5	12	SS			End of Boring Hollow stem auger used to full depth	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²

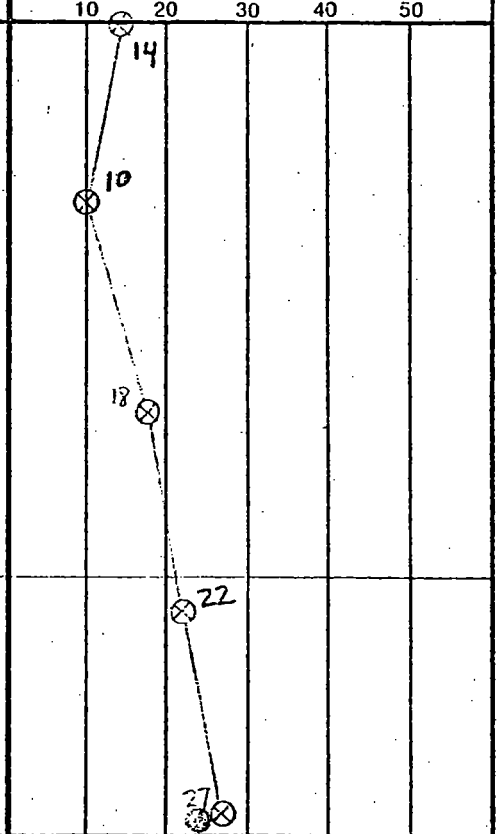
1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

X — — — — — ● — — — — — △

STANDARD "N" PENETRATION (BLOWS/FT.)

10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	5.5' WD	
W.L.	7.0' B.C.R.	7.0' A.C.R.
W.L.	WCI 7.5' AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 2-1-77	
BORING COMPLETED 2-1-77	
RIG B-50	FOREMAN HH
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

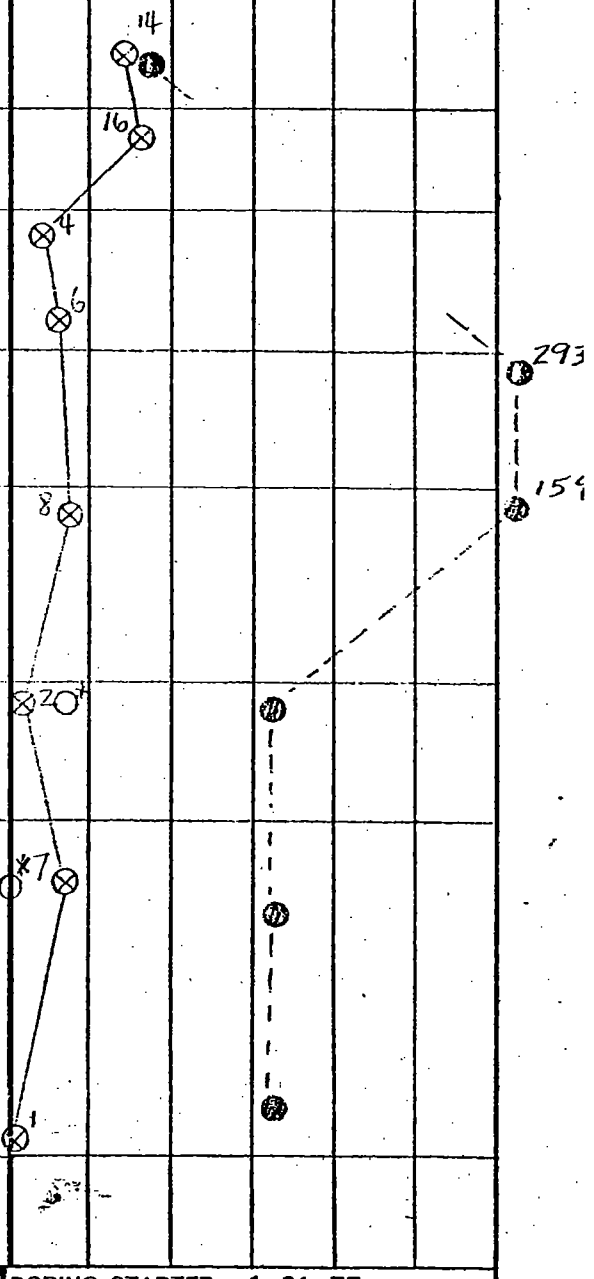
RBS41576

LOG OF BORING NO. B-11 (page 1 of 2)

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				SURFACE ELEVATION +188.7	
	1	SS		Greenish gray clayey fine to medium sand fill with a little	
5.0	2	SS		Gray fine to medium sand fill with some gravel - medium dense - moist - (SP)	
	3	SS		Gray slightly silty fine to coarse sand fill with some gravel - loose - saturated - (SP-SM) - with slight odor of fuel oil below 8.5 feet	
10.0	4	SS			
	4A	PA		Dark brown to black fibrous peat - wet - (Pt)	
15.0	5	SS		Black decomposed peat with a few shells - soft - moist - (Pt)	
20.0	6	SS		Black sandy clay to silty clay - soft - wet - (CL-SC)	
25.0	7	SS		Greenish gray silt with some clay and a little sand - very soft - saturated - (ML)	
30.0	8	SS			
				(continued on next page)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	7' WD	
W.L.	B.C.R.	A.C.R.
W.L.	6.1' AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-31-77
BORING COMPLETED	2-1-77
RIG B-40, B-50	FOREMAN HH, PS
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-11 (page 2 of 2)

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
					(continued from previous page)		
30.0					SURFACE ELEVATION		
					Greenish gray silt with some clay and a little sand - very soft - saturated - (ML)		
35.0	9	SS			Greenish gray silty fine to medium sand with a little gravel - medium dense - saturated - (SM)		
					End of Boring		
					Boring augered to full depth		
					Boring relocated 2' east below 21.5' depth		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²: 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %

STANDARD "N" PENETRATION (BLOWS/FT.): 10 20 30 40 50

WATER LEVEL OBSERVATIONS		
W.L.	7' WD	
W.L.	B.C.R.	A.C.R.
W.L.	6.1' AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-31-77
BORING COMPLETED	2-1-77
RIG B-40, B-50	FOREMAN HH, PS
DRAWN RC	APPROVED RC
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-12

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION ↴ 196.7	
	1	PA			Dark brown & slightly black slightly organic sand, trace roots - damp - frozen to 3 foot depth - (OL-SM) fill	
5.0	2	PA			Brown fine sand, little silt - moist - (SM)	
8.0	3	PA			Brown fine to coarse sand, trace silt - damp - (SW)	
10.0					End of Boring Solid stem augers used full depth.	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50

WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	
	DC1 4.5' 5 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-26-77	
BORING COMPLETED 1-26-77	
RIG B-50	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

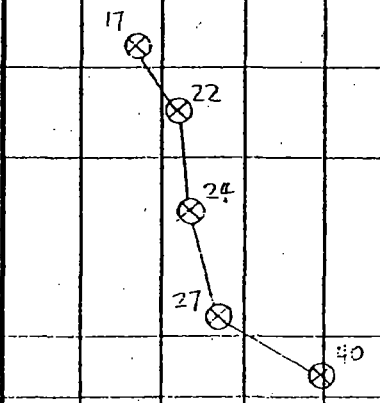
BBS41576

LOG OF BORING NO. B-13

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 198.3	
	1	AS			Brown sand fill to black organic silty topsoil - moist - frozen - (OL-SM)	
	2	AS			Brown silty clay fill - very stiff - (CL-ML) fill	
	1A	SS				
5.0	2	SS			Brown fine sand, trace silt & clay lumps - moist - medium dense - (SP-SM)	
	3	SS			Brown fine to medium sand - damp - medium dense - (SP)	
10.0	4	SS				
11.5	5	SS			Light gray brown fine to medium sand, trace gravel - moist - dense - (SP)	
					End of Boring	
					Solid stem auger used full depth	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-25-77
BORING COMPLETED	1-25-77
RIG B-40	FOREMAN CSB
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-14

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION ↴ 200.0	
	1	PA			Dark brown silty sand topsoil fill trace roots - damp - frozen - (OL-SM)	
	1A	SS			Dark brown fine to medium sand, trace gravel & silt - damp - dense to medium dense - (SM-SP)	
	2	SS				
5.0	2A	SS				
	3	SS			Brown fine to medium sand, trace fine gravel - damp to moist - medium dense to dense - (SP)	
10.0	4	SS				
11.5	5	SS				
					End of Boring Solid stem auger used full depth	
15.0						

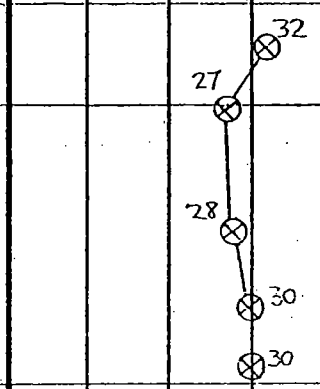
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²

1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

STANDARD "N" PENETRATION (BLOWS/FT.)

10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	
	DC1 8.0' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-25-77	
BORING COMPLETED 1-25-77	
RIG B-40	FOREMAN CSB
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-15

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION 200.6

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	PA			Dark brown silty fine to coarse sand fill, trace asphalt & miscellaneous moist - (SW) fill - strong creosote odor to 3 foot depth - slight creosote odor 3 foot depth to 6 foot depth - frozen to 2.5 foot depth	
	2	PA				
5.0	3	PA				
	4	PA			Brown fine to medium sand, trace coarse sand & gravel - moist - (SP)	
8.0						
					End of Boring Solid stem auger used full depth	
10.0						

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50

WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-25-77
BORING COMPLETED	1-25-77
RIG B-40	FOREMAN CSB
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

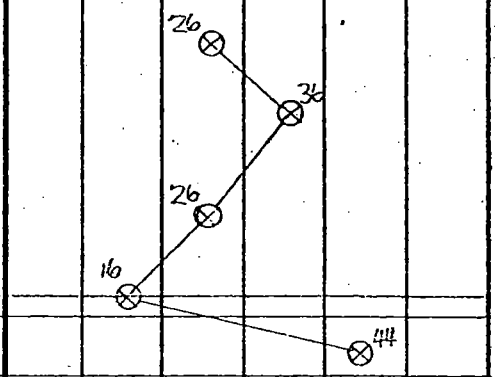
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. - B-16

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 196.4	
	1	AS			Dark brown silty fine sand topsoil fill, trace roots & brown clay - moist - frozen - (OL-SM) fill	
	2	AS				
	1	SS				
5.0	2	SS			Brown fine to medium sand, trace coarse sand, trace gravel & silt - moist - medium dense to dense - frozen to 1.5 foot depth - (SP)	
	3	SS				
	4	SS				
10.0	4A	SS			Light brown fine to medium sand - *	
11.5	5	SS			Brown fine to medium sand, trace coarse sand & gravel, trace silt - moist to wet - dense - (SP-SM)	
					End of Boring	
					Solid stem auger used full depth	
					* moist - (SP)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-25-77	
BORING COMPLETED 1-25-77	
RIG B-40	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

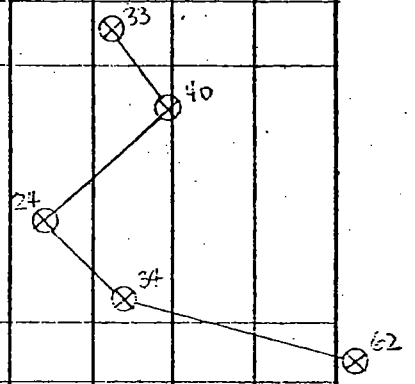
BBS41576

LOG OF BORING NO. B-17

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION 194.5	
	1	AS			Medium dark brown & slightly black fine to coarse sand & clay fill - *	
	1	SS			Light brown fine to medium sand, trace silt, trace gravel - damp - **	
5.0	2	SS			Brown fine to medium sand. trace coarse sand & fine gravel, trace silt - damp - dense to medium dense (SP-SM)	
	3	SS				
10.0	4	SS				
11.5	5	SS			Brown & light brown fine to medium sand, trace silt & gravel - moist - ***	
					End of Boring Solid stem auger used full depth * moist - frozen to 1.5 foot depth - (SC-SM) fill ** dense - (SP) *** very dense - (SP-SM)	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-25-77
BORING COMPLETED	1-25-77
RIG B-40	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

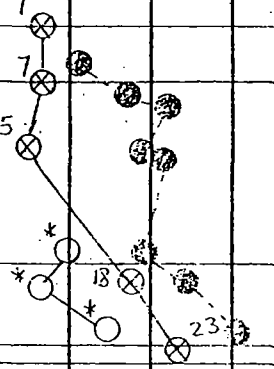
LOG OF BORING NO. B-18

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION 193.1

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	AS			Dark brown silty fine to coarse sand and medium gravel fill - moist - frozen to 1 foot depth - loose - (SM-SW) fill - strong creosote odor	
	1A	SS				
	1B	SS				
	2	SS			Brown clayey fine to coarse sand & gravel fill - moist - loose - (SC-SW)	fil
5.0	2A	SS				
	3	SS			Black organic silty & sandy clay - wet - loose - (OL)	
	4	SS				
10.0	4A	SS			Brown & slightly dark brown silty & sandy clay fill - soft to stiff - *	
	5	SS				
11.5	5A	SS			Brown silty fine to medium sand, trace gravel - wet - medium dense - (SM)	
15.0					End of Boring	
					Solid stem auger used full depth	
					* (CL-SC) fill	
					○* - Calibrated Penetrometer	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry A.B.	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-25-77
BORING COMPLETED	1-25-77
RIG B-40	FOREMAN CSB
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-19

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION 190.7

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	AS			Brown silty fine to coarse sand fill, trace gravel - damp - frozen to 3 foot depth - medium dense - (SM-SW)	
	1	SS				
5.0	2	SS				
	3	SS			Dark gray brown silty clay, trace roots - very stiff - (CL)	
	3A	SS				
	4	SS			Gray brown silty & sandy clay - stiff - (CL-SC)	
10.0	5	SS				
	5A	SS			Brown silty fine to medium sand, trace clay & gravel - wet - medium *	
11.5					End of Boring	
					Solid stem augers used full depth.	
					* dense - (SM)	

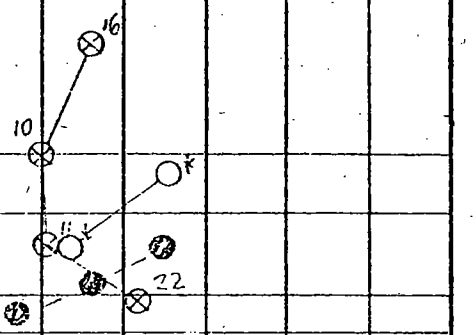
UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²

1 2 3 4 5

PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %

STANDARD "N" PENETRATION (BLOWS/FT.)

10 20 30 40 50



○* - Calibrated Penetrometer

WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry A.B.	
	Dry 5 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-26-77		
BORING COMPLETED	1-26-77		
RIG	B-40	FOREMAN	CSB
DRAWN	JO	APPROVED	JO
JOB #	90920	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BRS41576

LOG OF BORING NO. B-20

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell - Architect, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.2 (1 2 3 4 5) PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % — STANDARD "N" PENETRATION (BLOWS/FT.) (10 20 30 40 50)
					SURFACE ELEVATION 190.3		
	1	AS			Brown silty fine to medium sand fill, trace gravel - moist - (SW) fill		
5.0	2	PA			Brown fine to coarse sand, trace silt & gravel - moist - (SW)		
8.0	3	PA					
10.0					End of Boring Solid stem auger used full depth		

WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	
	DCI 3.5' 5 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED 1-26-77	
BORING COMPLETED 1-26-77	
RIG B-40	FOREMAN HH
DRAWN JO	APPROVED JO
JOB #90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF BORING NO. B-21

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell - Architects, Inc.
SITE 32nd Street West & Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² / PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % / STANDARD "N" PENETRATION (BLOWS/FT.)
SURFACE ELEVATION							
	1	AS			Brown silty fine to medium sand fill, trace gravel - moist - (SW) fill		
	2	PA					
5.0					Brown clayey sand - moist - (SC) fill		
	3	PA			Black to dark gray silty clay, slightly organic - (OL-CL)		
8.0	4	PA					
					End of Boring		
10.0					Solid stem auger used full depth		

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²: 1 2 3 4 5

PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT %

STANDARD "N" PENETRATION (BLOWS/FT.): 10 20 30 40 50

WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	1-26-77
BORING COMPLETED	1-26-77
RIG B-40	FOREMAN HH
DRAWN JO	APPROVED JO
JOB # 90920	SHEET

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

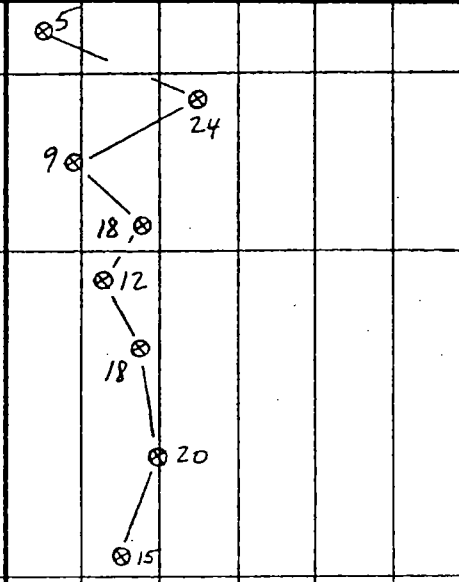
LOG OF BORING NO. 22

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION +194.7

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	SS			Dark brown and light brown fine to medium sand, trace of silt and fine gravel - loose - moist - (SP-SM) Fill	
	2	SS			Light brown fine sand, trace of silt, with small lenses of gray brown silty very fine sand - (SM-ML) - medium dense - damp - (SP)	
5.0	3	SS				
	4	SS				
	5	SS				
10.0	6	SS			Brown fine to coarse sand, trace of silt - medium dense - damp - (SW)	
	7	SS				
15.0	8	SS				
					End of Boring Auger boring full depth No casing or wash water used	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	9/2/77		
BORING COMPLETED	9/2/77		
RIG	Bomb	FOREMAN	PL
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

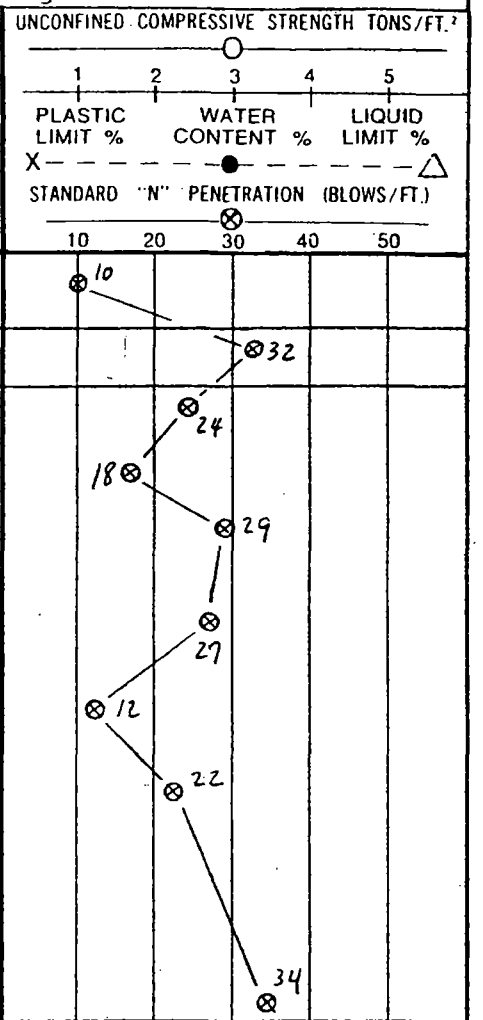
BBS41576

LOG OF BORING NO. 23

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION +193.5

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	SS			Dark gray brown very silty fine to coarse sand, trace of fine gravel - medium dense - moist - (SM-ML) -fill	
	2	SS			Yellow brown silty fine to medium sand, trace of fine gravel - dense - damp - (SM)	
5.0	3	SS				
	4	SS				
	5	SS				
10.0	6	SS				
	7	SS			Brown fine to medium sand, trace of silt and fine gravel - medium dense to dense - damp to moist at 18.5' - (SP)	
15.0	8	SS				
20.0	9	SS				
					End of Boring Auger boring full depth No casing or wash water used	



WATER LEVEL OBSERVATIONS		
W.L.	2' WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	9/2/77		
BORING COMPLETED	9/2/77		
RIG	Bomb	FOREMAN	PL
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. 24

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION +192.8

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	N
	1	SS			Black silty fine sand, trace of organic matter - medium dense - damp - (SM) Fill		19
	2	SS			Brown and gray brown silt, a little fine sand - medium dense - damp - (ML) - fill		12
5.0	3	SS			Brown fine sand, trace of silt and fine gravel - medium dense - damp - (SP) - fill		16
	4	SS					20
10.0	5	SS					22
	6	SS			Black silty fine sand, trace of fine gravel and organic matter - very dense - damp - (SM)		59
15.0	7	SS			Brown fine sand, trace of silt and fine gravel - medium dense - damp to wet at 18.5' - (SP)		25
20.0	8	SS					12
25.	9	SS			Gray brown fine to medium sand, trace of silt and fine gravel - medium dense - wet - (SP)		11
30.0	10	SS			Gray very fine sandy silt - medium dense - wet - (ML)		25
					End of Boring Auger boring full depth No casing or wash water used		

WATER LEVEL OBSERVATIONS		
W.L.	18' WS	
W.L.	B.C.R.	A.C.R.
W.L.	16.5' AB	
DCI	14.4' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	8/31/77		
BORING COMPLETED	8/31/77		
RIG	B-50	FOREMAN	BT
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

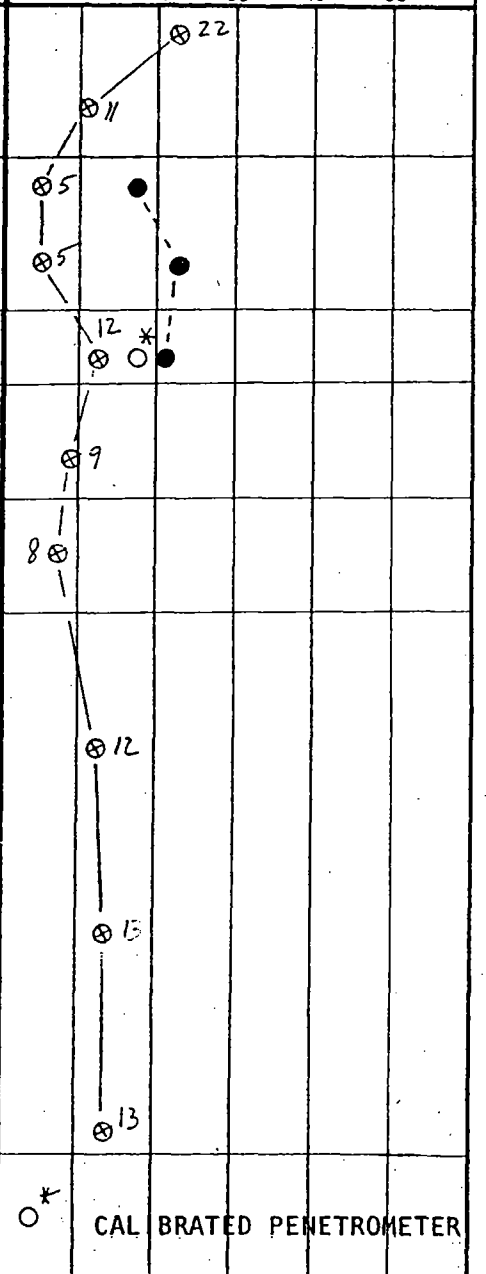
BBS41576

LOG OF BORING NO. 25

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
					SURFACE ELEVATION +191.7	
	1	SS			Gray brown silty fine to coarse sand trace of fine gravel - medium dense - damp - (SM) - fill	
	2	SS				
5.0	3	SS			Brown silt, a little fine sand, with a few thin (1/16") seams of topsoil - loose - damp - (ML) - fill	
	4	SS				
10.0	5	SS			Gray brown silty clay, trace of fine sand, with rust brown discolorations - stiff - (CL)	
	6	SS			Gray brown silty fine sand, with small clay lumps - loose - wet - (SM)	
15.0	7	SS			Gray fine sand, trace of silt - loose - wet - (SP-SM)	
20.0	8	SS			Brown fine to medium sand, trace of silt and fine gravel - medium dense - wet - (SP)	
25.0	9	SS				
30.0	10	SS				
					End of Boring Auger boring full dpeth No casing or wash water used	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	16.5' WS	
W.L.	B.C.R.	A.C.R.
W.L.		
DCI	12.6' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	8/31/77		
BORING COMPLETED	8/31/77		
RIG	B-50	FOREMAN	BT
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. 26

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION +190.9

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	SS			Dark gray brown sandy clayey silt, trace of fine gravel - loose - moist - (ML-CL) - fill	
	2	SS			Brown fine sand, trace of silt and fine gravel - loose - damp - (SP) - fill	
5.0	3	SS			Dark brown fine sand, trace of silt and gravel, with silt lumps - very loose - damp - (SP-SM) - fill	
	3A	SS				
	4	SS			Black sandy silt, trace of organic matter - very loose - damp - (ML-OL)	
	5	SS			Brown silty clay, trace of fine sand, very stiff - (CL)	
10.0	6	SS			Dark gray brown silty fine sand - loose - wet - (SM)	
	7	SS				
15.0	8	SS			Gray brown to gray fine to coarse sand, trace of fine to coarse gravel trace of silt - medium dense - wet - (SP)	
20.0	9	SS				
25.0	10	SS			Gray fine to coarse sand, trace of fine gravel and silt - medium dense wet - (SW)	
30.0						
31.5	11	SS				
					End of Boring Auger boring to 15', wash boring below 15', 15' of NX Casing used	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50

8, 7, 2, 2/6", 6, 7, 8, 13, 14, 16, 22, 17

* CALIBRATED PENETROMETER

WATER LEVEL OBSERVATIONS		
W.L.	Dry to 15' WD w/augers	
W.L.	10.7' B.C.R.	A.C.R.
W.L.		
DCI	15.3' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	9/2/77		
BORING COMPLETED	9/2/77		
RIG CME 75	FOREMAN	JD	
DRAWN WCK	APPROVED	WCK	
JOB # 90920-B	SHEET		

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. 27

OWNER: St. Louis Park Housing Authority	ARCHITECT-ENGINEER: Miller, Hanson, Westerbeck, Bell
SITE: 32nd Street West and Louisiana Avenue, St. Louis Park, Minnesota	PROJECT NAME: Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5) PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % / STANDARD "N" PENETRATION (BLOWS/FT.) (10 20 30 40 50)
					SURFACE ELEVATION +190.7		
	1	SS			Brown, black, and dark brown silty fine to coarse sand, trace of fine gravel with clay lumps - medium dense - moist - (SM-ML) - fill		⊗14
	2	SS					⊗13
5.0	3	SS			Brown fine to coarse sand, trace of silt and fine gravel with lenses of brown silty fine sand, (SM) - loose - damp - (SP) - fill		⊗8
	4	SS					⊗5
	5	SS			Brown silty fine sand, trace of fine gravel - very loose - wet - (SM) - fill		⊗2/9"
	5A	SS			Black organic peat - Pt)		⊗2/9"
10.0							
	6	SS			Dark gray silty sandy clay - soft - wet - (CL)		⊗6
	7	SS			Blue gray silty sandy clay with trace of rotten vegetation and a few thin seams of black peat - stiff - (CL)		3/6" ⊗
	7A	SS					⊗12
15.0					Brown gray silty fine sand trace of fine gravel and rotten vegetation - medium dense - wet - (SM)		
	8	SS					⊗11
20.0							
	9	SS					18 ⊗
25.0					Gray fine to coarse sand, some fine gravel, trace of silt - medium dense - wet - (SW)		⊗13
	10	SS					
30.0							⊗15
	11	SS					
35.0							
36.5	12	SS					⊗15
					End of Boring Auger Boring to 12.5' Wash boring below 12.5' 15' of NX casing used 36.5' of Revert drilling mud used		

WATER LEVEL OBSERVATIONS			
W.L.	Dry to 12.5' WD w/augers		
W.L.	9.5' B.C.R.	A.C.R.	
W.L.			
WCI	9.3' 6 Days AB		

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	9/1/77		
BORING COMPLETED	9/1/77		
RIG	CME-75	FOREMAN	JD
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

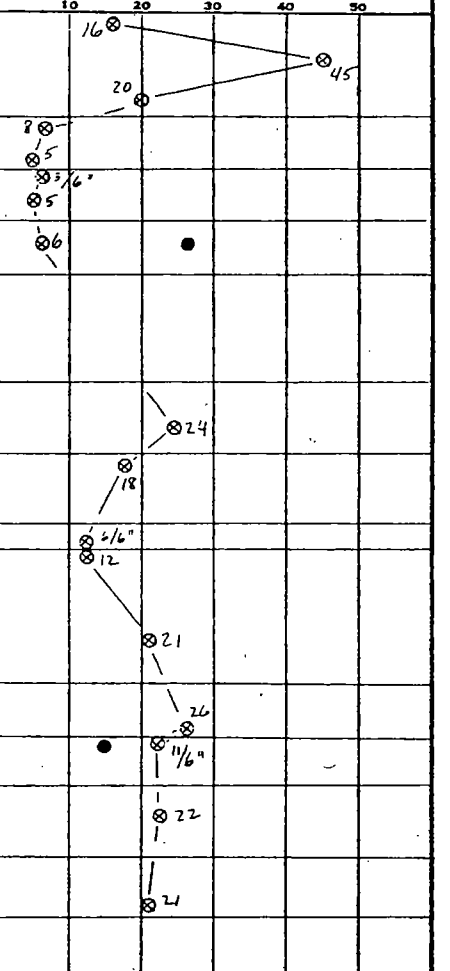
BBS 71576

LOG OF BORING NO. 28

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	**PROJECT NAME** Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
					SURFACE ELEVATION +190.2	
	1	SS			Brown silty fine sand (SM) with clay lumps - medium dense to dense - damp to moist - fill	
	2	SS				
5.0	3	SS				
	4	SS			NOTE A	
	5	SS				
10.0	5A	SS			NOTE B	
	6	SS				
	7	SS			Black organic silty sandy clay, trace of fine roots - soft - wet - (CL-OL)	
15.0	8	ST			Gray silt to clayey silt - stiff - (ML-CL)	
20.0	9	ST				
	9A	ST			Gray silty fine to coarse sand - medium dense - wet - (SM)	
	10	SS				
25.0	11	SS			Gray fine to medium sand, trace of silt - medium dense - wet - (SP)	
30.0	12	SS			Gray sandy silt, trace of fine gravel - medium dense - wet - (ML)	
	12A	SS				
35.0	13	SS			Gray fine to medium sand, trace of silt - medium dense - wet - (SP)	
40.0	14	SS			Gray very fine to fine sand, trace of silt-medium dense - (SP)	
	4A	SS			Gray silty sandy clay - stiff - (CL)	
45.0	15	SS			Gray fine to coarse sand, trace of silt - medium dense - wet - (SW)	
50.0	16	SS			Gray fine to medium sand, trace of silt - medium dense - wet - (SP)	
51.5					End of Boring	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % × WATER CONTENT % ● LIQUID LIMIT % △
STANDARD "N" PENETRATION (BLOWS/FT.) ⊗
10 20 30 40 50



NOTE A - Brown fine to coarse sand, trace of silt, with small inclusions of clay and topsoil - medium dense to loose - damp to moist - (SP) - fill

NOTE B: Gray fine to medium sand, trace of silt and fine gravel with small irregular silt seams - loose - wet - (SP) - probable fill

Auger boring to 8'
Wash boring below 8'
10' of NX casing used
51.5 feet of Revert drilling mud used

WATER LEVEL OBSERVATIONS			
W.L.	Dry to 8' WD w/augers		
W.L.	10.9' B.C.R.	A.C.R.	
W.L.			
DCI	8.8' 6 Days AB		

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 Annapolis Lane
Minneapolis, MN 55441

BORING STARTED	8/31/77		
BORING COMPLETED	8/31/77		
RIG	#8	FOREMAN	EVH
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

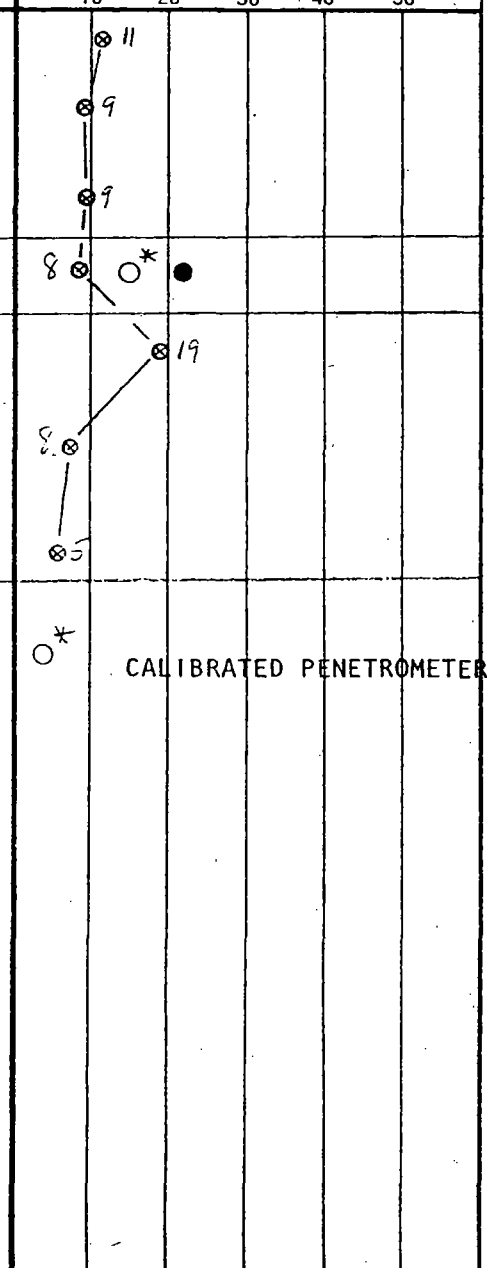
BBS-81671

LOG OF BORING NO. 29

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION +189.6

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	SS			Brown fine to coarse, trace of silt and fine gravel - medium dense to dense - damp - (SP) - possible fill	
	2	SS				
5.0	3	SS				
	4	SS			Gray brown and gray silty clay - trace of fine sand - stiff - (CL)	
10.0	5	SS			Yellow red to yellow brown fine sand, trace of silt and fine gravel medium dense to loose - damp to moist at 13.5'- (SP)	
	6	SS				
15.0	7	SS				
					End of Boring Auger boring full depth No casing or wash water used	



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.		
DCI	11.8' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	8/31/77
BORING COMPLETED	8/31/77
RIG B-50	FOREMAN PP
DRAWN WCK	APPROVED WCK
JOB # 90920-B	SHEET

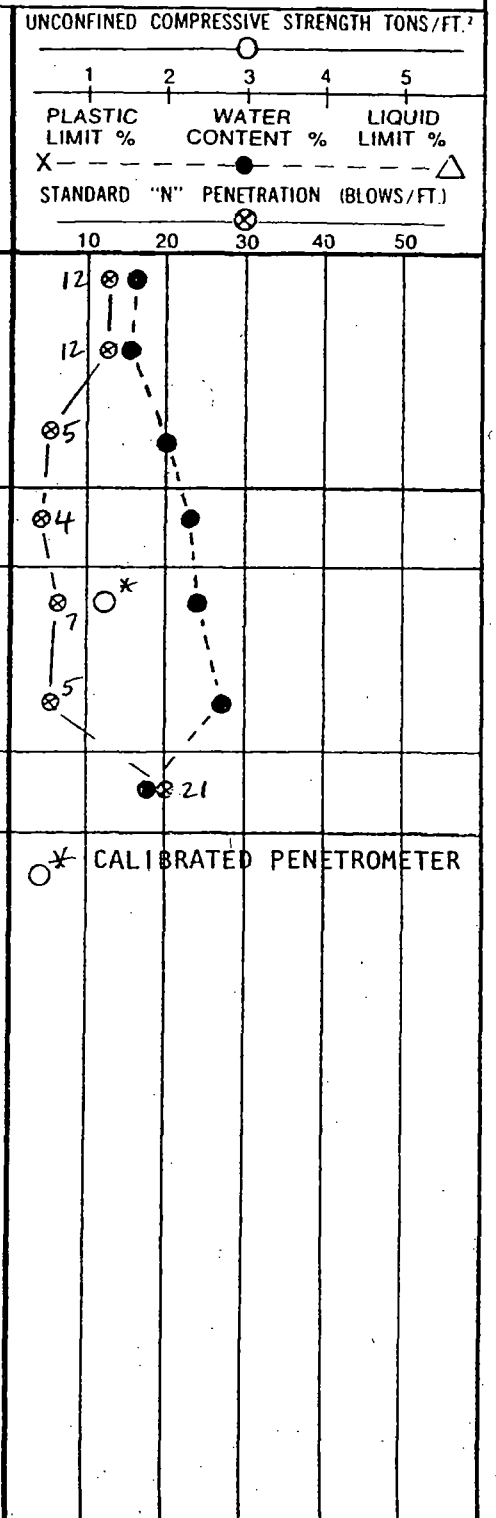
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. 30

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Ave St. Louis Park, Minnesota	**PROJECT NAME** Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
				SURFACE ELEVATION +189.2	
	1	SS		Black and brown silty sandy clay, with seams of brown silty fine sand - stiff - (CL) - fill	
	2	SS			
5.0	3	SS			
	4	SS		Black silty clay, trace of sand and organic matter - soft to stiff - (CL-OL)	
10.0	5	SS		Blue gray silty clay, trace of fine sand - stiff - (CL)	
	6	SS			
15.0	7	SS		Dark gray brown silty sandy clay - stiff - (CL)	
				End of Boring Auger boring full depth No casing or wash water used	



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.		
DCI	11.2' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	8/30/77		
BORING COMPLETED	8/30/77		
RIG	B-50	FOREMAN	PP
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. 31

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5) PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT % — STANDARD "N" PENETRATION (BLOWS/FT.) (10 20 30 40 50)
					SURFACE ELEVATION +189.2		
	1	SS			Black silty fine sand, trace of roots and twigs, with pieces of wood		20
	2	SS			Brown fine to coarse sand, a little gravel, trace of silt, - medium dense - damp - (SW)		13
5.0	3	SS			Black silt, trace of organic matter, with few seams of peat - loose - damp - (ML-OL) large pieces of wood at 5'		7
	4	SS			Mottled gray brown and brown clayey silt - trace of sand - soft to stiff - (ML-CL)		7
	5	SS			Light brown silt with rust brown discolorations - soft - wet - (ML-CL)		5
10.0	6	SS			Light gray brown silty sandy clay, with irregular thin sand seams - soft - (CL-ML)		7
	7	SS			Gray brown fine sand, trace of silt - loose - wet - (SP)		8
15.0	8	SS			Gray brown silty fine to coarse sand, some fine to medium gravel - medium dense - wet - (SM-GM)		31
20.0	9	SS			Gray fine sand, a little fine to coarse gravel, trace of silt - medium dense - wet - (SP)		22
25.9	10	SS			Gray fine to coarse sand, trace of silt and fine gravel - medium dense - wet - (SW)		16
30.0							
31.5	11	SS					22
					End of Boring Auger boring to 12.5', wash boring below 12.5', 15 feet of NX casing used		

WATER LEVEL OBSERVATIONS		
W.L.	14' WS	
W.L.	8.3' B.C.R.	A.C.R.
W.L.	12.9' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	9/2/77		
BORING COMPLETED	9/2/77		
RIG	CME 75	FOREMAN	JD
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

LOG OF BORING NO. 32

OWNER: St. Louis Park Housing Authority	ARCHITECT-ENGINEER: Miller, Hanson, Westerbeck, Bell
SITE: 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME: Oak Park Village

SURFACE ELEVATION +188.9

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5) PLASTIC LIMIT % · WATER CONTENT % · LIQUID LIMIT % · STANDARD "N" PENETRATION (BLOWS/FT.) (10 20 30 40 50)
	1	SS			Black silty fine sand, with pieces of asphalt - medium dense - damp - (SM) - fill		19
	2	SS			Gray brown fine to coarse sand, a little fine to coarse gravel, trace of silt - medium dense - damp (SW) possible fill		23
5.0	3	SS			Brown fine to medium sand, trace of silt and fine gravel		12
	4	SS			medium dense - damp - (SP)		10
	5	SS			Horizontally laminated seams of silty clay with few sand seams - stiff - (CL)		10
10.0							
	6	SS			Brown fine sand, trace of silt, with few seams of horizontally laminated silt from 10' to 13' - medium dense - damp changing to wet at 14' - (SP)		12
	7	SS					12
15.0							
	8	SS					13
20.0							
	9	SS			Gray brown fine to medium sand, trace of silt and fine gravel - medium dense - wet (SP)		18
25.0							
	10	SS			Brown fine sand, trace of silt, trace of fine to coarse gravel - medium dense - wet - (SP)		15
30.0							11
35.0					Gray brown fine to coarse sand, a little fine to coarse gravel, trace of silt dense - wet - (SW)		39
36.5					End of Boring Auger boring to 12.5' Wash boring below 12.5' 10 feet of NX casing used 36.5 feet of Revert drilling mud used.		CALIBRATED PENETROMETER

WATER LEVEL OBSERVATIONS			
W.L.	14' WS	W.S. OR W.D.	
W.L.	14.2' B.C.R.	A.C.R.	
W.L.			
WCI	15.1' 6 Days AB		

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	9/1/77		
BORING COMPLETED	9/2/77		
RIG	CME 75	FOREMAN	JD
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

BBS 71576

LOG OF BORING NO. 33

OWNER: St. Louis Park Housing Authority	ARCHITECT-ENGINEER: Miller, Hanson, Westerbeck, Bell
SITE: 32nd Street West and Louisiana Avenue, St. Louis Park, Minnesota	PROJECT NAME: Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³	UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5) PLASTIC LIMIT % / WATER CONTENT % / LIQUID LIMIT % / STANDARD "N" PENETRATION (BLOWS/FT.) (10 20 30 40 50)
					SURFACE ELEVATION +188.1		
	1	SS			Brown, dark brown, and black silty fine sand, with small lumps of clay and topsoil - medium dense to loose - damp changing to wet at 8' - (SM) fill		26, 30, 11, 5, 6
	2	SS					
5.0	3	SS					
	4	SS					
	5	SS			Black silty sandy clay, trace of rotted vegetation - stiff - (CL)		8
10.0	6	SS					
	7	SS			Black and gray sandy clayey silt, trace of fine gravel - soft - wet - (ML-CL)		6
15.0	8	SS			Gray silty fine to medium sand with thin irregular seams of gray clay - loose - wet - (SM)		9
20.0	9	SS			Gray fine to medium sand, trace silt and fine gravel medium dense - wet - (SP)		13, 18, 20
25.0	10	SS					
30.0	11	SS					
35.0	12	SS			Gray fine to coarse sand, trace silt and fine gravel medium dense - wet - (SW)		16, 26, 24
40.0	13	SS					
45.0	14	SS					
50.0	15	SS			Brown very fine to fine sand, trace silt - medium dense - wet - (SP)		20
51.5					End of boring Auger boring to 10 feet Wash boring below 10 feet 12.5 feet of NX casing used 51.5 feet of Revert drilling mud used		

WATER LEVEL OBSERVATIONS		
W.L.	Dry to 10 ' WD w/augers	
W.L.	11.9' B.C.R.	A.C.R.
W.L.	DCI 7.4' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 Annapolis Lane
Minneapolis, Minnesota

BORING STARTED	9-1-77		
BORING COMPLETED	9-1-77		
RIG	#8	FOREMAN	EVH
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

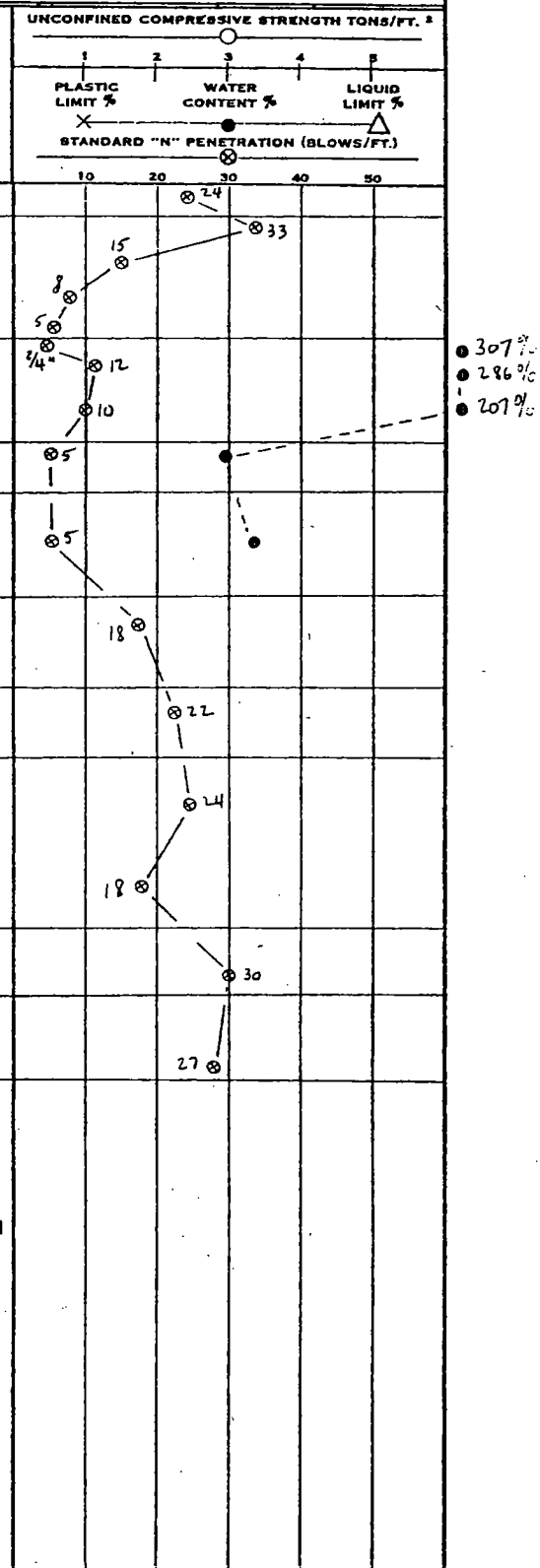
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS-8167

LOG OF BORING NO. 34

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	**PROJECT NAME** Oak Park Village

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
					SURFACE ELEVATION +187.6	
	1	SS			Dark gray brown silty fine sand - medium dense - damp (SM) - fill	
	2	SS				
5.0	3	SS			Gray brown fine to coarse sand, trace of silt and fine gravel - with small silt lumps to 4' - medium dense to loose - moist to wet at 8' - (SP) - fill	
	4	SS				
	5	SS				
10.0	5A	SS				
	6	SS			Black fibrous peat (Pt)	
	7	SS				
15.0						
	8	SS			Horizontally laminated gray clayey silt - soft - (ML-CL)	
20.0					Gray silty clay, with thin irregular sand seams - soft (CL)	
	9	SS				
25.0						
	10	SS			Gray silty fine to medium sand with irregular seams and lenses of gray silt and clay - medium dense - wet - (SM)	
30.0					Yellow brown fine to medium sand, trace of silt - medium dense - wet - (SP)	
	11	SS				
35.0						
	12	SS			Gray brown fine sand, trace of silt - medium dense - wet - (SP)	
40.0						
	13	SS				
45.0					Gray clayey sandy silt - dense - wet - (ML)	
	14	SS				
50.0					Brown fine to coarse sand, a little fine to coarse gravel - trace of silt - medium dense - wet - (SW)	
51.5	15	SS				
					End of Boring	
					Auger boring to 8'	
					Wash boring below 8'	
					15' of NX casing used	
					51.5' of Revert drilling mud used	



WATER LEVEL OBSERVATIONS		
W.L.	Dry to 8' WD w/augers	
W.L.	12.5' B.C.R.	A.C.R.
W.L.		
DCT	4.1' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 Annapolis Lane
Minneapolis, MN 55441

BORING STARTED	9/1/77		
BORING COMPLETED	9/1/77		
RIG	#8	FOREMAN	EVH
DRAWN	WCK	APPROVED	WCK
JOB #	90920-8	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS-81671

LOG OF BORING NO. 35

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	**PROJECT NAME** Oak Park Village

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² — 1 2 3 4 5
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.) — 10 20 30 40 50

SURFACE ELEVATION + 188.6

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
	1	SS		Black and dark brown silty sandy clay (CL) and silty fine sand (SM) - loose - damp - fill	
	2	SS			
5.0	3	SS			
	4	SS		Gray silty clay with seams of brown silty sand - soft - (CL) - fill	
	5	SS			
	5A	SS			
10.0	6	SS		Dark brown and black fibrous peat - (Pt)	
	7	SS		Dark gray to black silty fine sand, trace of fine to coarse gravel - loose - wet - (SM)	
15.0	8	SS			
				Gray silty fine sand, with irregular thin silt lenses - medium dense - wet - (SM)	
20.0	9	SS			
25.0	10	SS			
30.0	11	SS		Gray brown fine sand, trace of silt and fine gravel - medium dense - wet - (SP)	
35.0	12	SS			
40.0	13	SS		Brown very fine to fine sand, trace of silt - medium dense - wet - (SP)	
45.0	14	SS			
50.0	15	SS		Gray brown fine to coarse sand, some fine to coarse gravel, trace of silt, medium dense - wet - (SW)	
51.5				End of Boring Auger boring to 8' Wash boring below 8' 15' of NX casing used 51.5' of Revert drilling mud used	

301 @ 7'

WATER LEVEL OBSERVATIONS		
W.L.	Dry to 8' WD w/auger	
W.L.	14.3' B.C.R.	A.C.R.
W.L.		
DCT	6.7' 6 Days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 Annapolis Lane
Minneapolis, MN 55441

BORING STARTED	8/31/77		
BORING COMPLETED	8/31/77		
RIG	#8	FOREMAN	EVH
DRAWN	WCK	APPROVED	WCK
JOB #	90920-8	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS-81671

LOG OF BORING NO. 36

OWNER St. Louis Park Housing Authority	ARCHITECT-ENGINEER Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	PROJECT NAME Oak Park Village

SURFACE ELEVATION +189.4

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
	1	SS			Brown, dark brown and black silty fine sand, with clay lumps - medium dense to loose - moist - (SM) - fill	
5.0	3	S			Dark gray brown silty sandy clay - soft - wet - (CL) possible fill	
	4	SS				
10.0	5	SS			Black peat - (Pt)	
	6	SS				
	7	SS			Gray silty fine sand, trace gravel - medium dense - wet	(SM)
15.0	8	SS			Gray fine sand sand, trace silt - medium dense - wet -	(SP)
20.0	9	SS			Gray brown fine to coarse sand, trace silt - medium dense - wet - (SW)	
25.0	10	SS			Gray brown fine sand, trace silt - medium dense - wet - (SP)	
30.0	11	SS				
35.0	12	SS				
40.0	13	SS			Gray brown very fine to fine sand, trace silt - medium dense - wet - (SP)	
45.0	14	SS				
50.0					Gray fine to coarse sand trace fine gravel - medium dense - wet - (SW)	
51.5	15	SS				
					End of boring Auger boring to 10 feet Wash boring below 10 feet 15 feet of NX casing used 51.5 feet of Revert drilling mud used	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50

248%
341%

WATER LEVEL OBSERVATIONS		
W.L.	Dry to 10' WD w/augers	
W.L.	10.5' B.C.R.	A.C.R.
W.L.	DCI 8.6' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 Annapolis Lane
Minneapolis, Minnesota

BORING STARTED	8/31/77		
BORING COMPLETED	8/31/77		
RIG	#8	FOREMAN	EVH
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

B&S-81671

LOG OF BORING NO. 37

OWNER St. Louis Park Housing Authority	**ARCHITECT-ENGINEER** Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Lousiana Avenue, St. Louis Park, Minnesota	**PROJECT NAME** Oak Park Village

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1, 2, 3, 4, 5)
PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.) (10, 20, 30, 40, 50)

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST. RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
				SURFACE ELEVATION +189.6	
	1	SS		Brown silty fine sand, with clay seams - dense to loose damp - (SM) - fill	
	2	SS			
5.0	3	SS		Blue gray silty sandy clay soft - wet - (CL) - poss. fill	
	4	SS			
	4A	SS			
	5	SS		Gray brown fine to medium sand, trace silt - very loose wet - (SP) - poss. fill	
10.0	6	SS			
	7	SS		Black peat - (Pt)	
15.0	8	SS		Black organic clay - soft - wet - (OL)	
20.0	9	SS		Gray silty clay, trace sand soft - wet - (CL)	
	10	SS		Dark gray silty sandy clay - soft - wet - (CL)	
25.0	10A	SS		Gray fine to coarse sand, trace silt - medium dense - wet - (SW)	
30.0	11	SS		Dark gray silty sandy clay - soft to stiff - (CL)	
35.0	12	SS			
40.0	13	SS		Gray silty fine to medium sand, trace fine gravel - medium dense - wet - (SM)	
45.0	14	SS		Gray fine to coarse sand, trace silt and fine gravel - medium dense - wet - (SW)	
50.0	15	SS			
51.5				End of Boring Auger boring to 15 feet Wash boring below 15 feet 20 feet of NX casing used 51.5 feet of Revert drilling mud used	

109 %
268 %

WATER LEVEL OBSERVATIONS			
W.L.	8.5'	W.S. OR W.D. XXXXXX	
W.L.	4.5' B.C.R.	A.C.R.	
W.L.	8.8' 6 days AB		

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 Annapolis Lane
Minneapolis, Minnesota

BORING STARTED	9-1-77		
BORING COMPLETED	9-1-77		
RIG	#8	FOREMAN	EVH
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS-81671

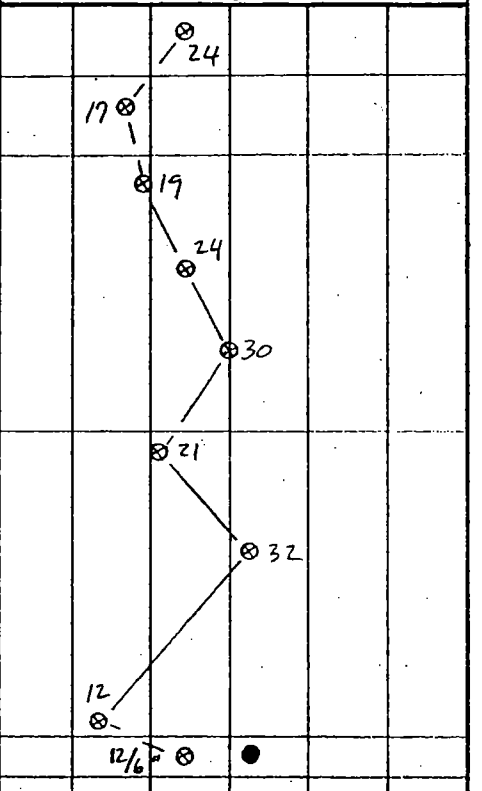
LOG OF BORING NO. 38

OWNER	ARCHITECT-ENGINEER
St. Louis Park Housing Authority	Miller, Hanson, Westerbeck, Bell
SITE 32nd Street West and Louisiana Avenue St. Louis Park, Minnesota	**PROJECT NAME** Oak Park Village

SURFACE ELEVATION +193.5

DEPTH ELEVATION	SAMPLE NO.	TYPE SAMPLE	SAMPLE DIST.	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.3
	1	SS			Brown silty fine to coarse sand, trace gravel - medium dense - damp - (SM) -	fill
	2	SS			Light brown fine sand, trace silt - medium dense - dry - (SP) - possible	fill
5.0	3	SS			Light brown fine to coarse sand, trace silt and fine to coarse gravel - medium dense damp - (SW)	-
	4	SS				
	5	SS				
10.0						
	6	SS			Brown fine sand, trace silt and fine gravel - medium dense to dense - damp, changing to wet at 19' - (SP)	
15.0	7	SS				
	8	SS			Gray brown clayey silt, trace fine sand - stiff - (ML-CL)	
20.0	8A	SS				
					End of boring Auger boring full depth no casing or wash water used	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.²
1 2 3 4 5
PLASTIC LIMIT % WATER CONTENT % LIQUID LIMIT %
STANDARD "N" PENETRATION (BLOWS/FT.)
10 20 30 40 50



WATER LEVEL OBSERVATIONS		
W.L.	Dry WD	
W.L.	B.C.R.	A.C.R.
W.L.	Dry AB	
	DCI 9.2' 6 days AB	

SOIL TESTING SERVICES
OF MINNESOTA, INC.
2405 ANNAPOLIS LANE
MINNEAPOLIS, MINN. 55441

BORING STARTED	8/30/77		
BORING COMPLETED	8/30/77		
RIG	B-50	FOREMAN	PP
DRAWN	WCK	APPROVED	WCK
JOB #	90920-B	SHEET	

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

BBS41576

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St., Philadelphia, Pa. 19103

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Standard Method for

PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS[1]

ASTM Designation: D 1586 – 67

This Standard of the American Society for Testing and Materials is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

1. Scope

1.1 This method describes a procedure for using a split-barrel sampler to obtain representative samples of soil for identification purposes and other laboratory tests, and to obtain a measure of the resistance of the soil to penetration of the sampler.

2. Apparatus

2.1 *Drilling Equipment*—Any drilling equipment shall be acceptable that provides a reasonably clean hole before insertion of the sampler to ensure that the penetration test is performed on undisturbed soil, and that will permit the driving of the sampler to obtain the sample and penetration record in accordance with the procedure described in 3. Procedure. To avoid "whips" under the blows of the hammer, it is recommended that the drill rod have a stiffness equal to or greater than the A-rod. An "A" rod is a hollow drill rod or "steel" having an outside diameter of 1⅝ in. or 41.2 mm and an inside diameter of 1⅛ in. or 28.5 mm, through which the rotary motion of drilling is transferred from the drilling motor to the cutting bit. A stiffer drill rod is suggested for holes deeper than 50 ft (15 m). The hole shall be limited in diameter to between 2¼ and 6 in. (57.2 and 152 mm).[2]

2.2 *Split-Barrel Sampler*—The sampler shall be constructed with the dimensions indicated in Fig. 1. The drive shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The coupling head shall have four ½-in. (12.7-mm) (minimum diameter) vent ports and shall contain a ball check valve. If sizes other than the 2-in. (50.8-mm) sampler are permitted, the size shall be conspicuously noted on all penetration records.

2.3 *Drive Weight Assembly*—The assembly shall consist of a 140-lb (63.5-kg) weight, a driving head, and a guide permitting a free fall of 30 in. (0.76 m). Special precautions shall be taken to ensure that the energy of the falling weight is not reduced by friction between the drive weight and the guides.

2.4 *Accessory Equipment*—Labels, data sheets, sample jars, paraffin, and other necessary supplies should accompany the sampling equipment.

3. Procedure

3.1 Clear out the hole to sampling elevation using equipment that will ensure that the material to be sampled is not disturbed by the operation. In saturated sands and silts withdraw the drill bit slowly to prevent loosening of the soil around the hole. Maintain the water level in the hole at or above ground water level.

3.2 In no case shall a bottom-discharge bit be permitted. (Side-discharge bits are permissible.) The process of jetting through an open-tube sampler and then sampling when the desired depth is reached shall not be permitted. Where casing is used, it may not be driven below sampling elevation. Record any loss of circulation or excess pressure in drilling fluid during advancing of holes.

3.3 With the sampler resting on the bottom of the hole, drive the sampler with blows from the 140-lb (63.5-kg) hammer falling 30 in. (0.76 m) until either 18 in. (0.45 m) have been penetrated or 100 blows have been applied.

3.4 Repeat this operation at intervals not longer than 5 ft (1.5 m) in homogeneous strata and at every change of strata.

3.5 Record the number of blows required to effect each 6 in. (0.15 m) of penetration or fractions thereof. The first 6 in. (0.15 m) is considered to be a seating drive. The number of blows required for the second and third 6 in. (0.15 m) of penetration added is termed the penetration resistance, *N*. If the sampler is driven less than 18 in. (0.45 m), the penetration resistance is that for the last 1 ft (0.30 m) of penetration (if less than 1 ft (0.30 m) is penetrated, the logs shall state the number of blows and the fraction of 1 ft (0.30 m) penetrated).

3.6 Bring the sampler to the surface and open. Describe carefully typical

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[1] Under the standardization procedure of the Society, this method is under the jurisdiction of the ASTM Committee D-18 on Soil and Rock for Engineering Purposes. A list of members may be found in the ASTM Year Book.

Current edition accepted Oct. 20, 1967. Originally issued 1958. Replaces D 1586 – 64 T.

[2] Hvorslev, M. J., *Surface Exploration and Sampling of Soils for Civil Engineering Purposes*, The Engineering Foundation, 345 East 47th St., New York, N. Y. 10017.

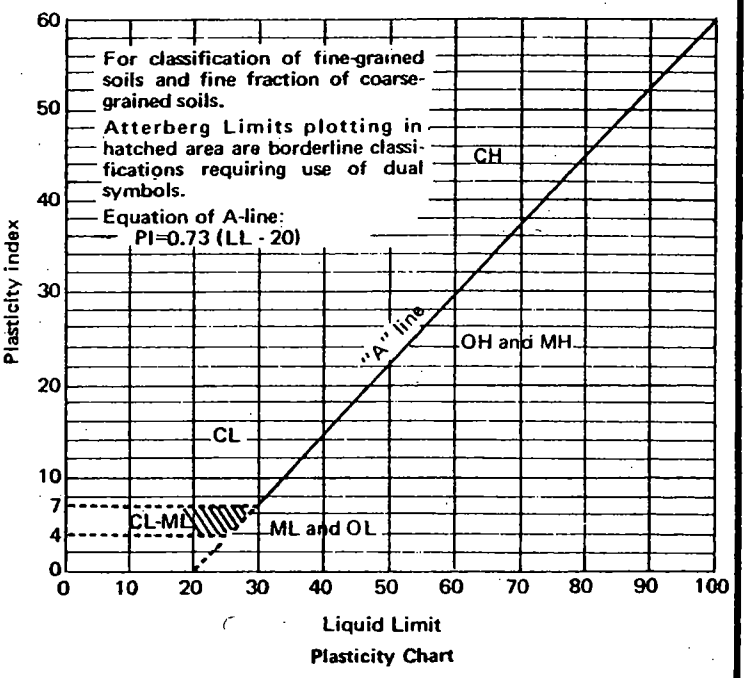
UNIFIED SOIL CLASSIFICATION SYSTEM

Major divisions			Group symbols	Typical names	Laboratory classification criteria
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravels (More than half of coarse fraction larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
		Gravels with fines (Appreciable amount of fines)	GM d / u	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM d / u	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly organic soils		Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain-size curve.
Depending on percentage of fines (fraction smaller than No. 200 sieve size); coarse-grained soils are classified as follows:
Less than 5 per cent . . . . . GW, GP, SW, SP
More than 12 per cent . . . . . GM, GC, SM, SC
5 to 12 per cent . . . . . *Borderline* cases requiring dual symbols

Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols

Limits plotting in hatched zone with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols.



Plasticity Chart

STS Job No. 90920-B
Oak Park Village
St. Louis Park, Minnesota

RECOMMENDED GRADATION FOR SELECT GRANULAR BACKFILL UNDER STRUCTURES AND PAVEMENTS

Sieve Size	Percent Passing
3"	100
#4	50-90
#40	20-65
#100	10-50
#200	0-8

Planning Department
December 9, 1977

llg

DEVELOPMENT OF BLOCK 3

Oak Park Village

Final plans for the development of 100 units of townhouses and apartments were approved by the Housing and Redevelopment Authority, Planning Commission, and City Council in September and October of 1977.

These plans were approved on the basis of their consistency with the previously adopted Urban Renewal Plan, Environmental Assessment and the Supplement, and the resolutions and agreements between the City, PCA, and the Minnesota Environmental Quality Board.

On December 6, 1977, the Minnesota Pollution Control Agency passed a resolution on a vote of 7-2 encouraging the City to reconsider its decision to proceed with the development on any portion of the site including Oak Park Village and the proposed extension of Louisiana Avenue.

Development of Oak Park Village is considered to be a totally separate activity from construction of Louisiana Avenue and was previously thoroughly reviewed under the environmental assessment procedures.

While it is not necessary for the Council to continue to reconsider its action on development, the developer of Block 3 has requested a definitive action by the Council on this most recent request to facilitate closing of the purchase of Block 3 and to complete financing for development of Block 3.

Since no new information has been presented which would justify delaying development; since previous environmental assessments and resolutions and agreements involving the City, the Pollution Control Agency, and the Minnesota Environmental Quality Board have allowed for development of Block 3; and since excavation of contaminated soil, as well as the construction of utilities to the site, are completed; a resolution reconfirming the City's approval of development is attached for consideration.

RESOLUTION NO. _____

RESOLUTION OF THE CITY COUNCIL RECONFIRMING ITS APPROVAL OF DEVELOPMENT ON BLOCK 3, OAK PARK VILLAGE

WHEREAS, the City of St. Louis Park has demonstrated its concern for all aspects of the City's environment including the manner in which land is developed and used and factors related to ground, air, and noise pollution, and

WHEREAS, the City undertook redevelopment identified as Oak Park Village and received approval and partial financial assistance from the Department of Housing and Urban Development, and

WHEREAS the City has taken action to eliminate and prevent blight in Oak Park Village and has provided for new park and open space and residential development consistent with approved plans, and

WHEREAS, the City completed an Environmental Assessment and a Supplementary Environmental Assessment in July of 1976 and received approval from the Environmental Quality Board of the State of Minnesota, and

WHEREAS, the development plan contained in the Supplement of the Environmental Assessment included development of the northern portion of Oak Park Village including Block 3, and

WHEREAS, the Minnesota Pollution Control Agency passed a resolution providing for the development of the northern portion of Oak Park Village including Block 3 with provisions for a stipulation between the City and the Minnesota Pollution Control Agency regarding removal of certain contaminated soils in the northern portion of Oak Park Village, and

WHEREAS, said stipulation has been executed by the parties during the summer of 1977 and the City has excavated contaminated material in the northern portion of Oak Park Village, including Block 3, and

WHEREAS, the City's Housing and Redevelopment Authority, Planning Commission, and City Council have approved and issued a special permit providing for the development of 100 dwelling units on Block 3, Oak Park Village, consistent with previously approved resolutions of the Minnesota Environmental Quality Board, the Pollution Control Agency, and the City and consistent with the adopted Urban Renewal Plan, an Environmental Assessment, and its supplement, and

WHEREAS, the City and the developer have incurred costs relating to excavation of contaminated soil, soil testing, preparation of construction plans, and insulation of utilities providing for the development of Block 3, and

WHEREAS, Phase II of the Barr Engineering Report has been prepared which does not provide any new evidence of contamination or problem with regard to Block 3 nor does it propose any further excavation or other remedial measures that would prevent development of Block 3, and

WHEREAS, on November 19, 1976, at a joint meeting of the Housing and Redevelopment Authority and City Council, the City reconfirmed its position authorizing development on Block 3, and

WHEREAS, no new evidence or information has been presented to the City which would justify the City rescinding its past approval and preventing or prohibiting development of Block 3

NOW THEREFORE BE IT RESOLVED that the City of St. Louis Park hereby reaffirms its approval of development on Block 3, Oak Park Village.

Adopted by the City Council December 12, 1977

_____
Mayor

ATTEST:

_____
City Clerk

Reviewed for administration:

_____
City Manager

Approved as to form and legality:

_____
City Attorney

DEC

DIVERSIFIED EQUITIES CORPORATION

600 Chamber of Commerce Building, 15 South Fifth Street, Minneapolis, Minnesota 55402, Telephone: 338-8572

December 22, 1977

Mayor Irving Sterne
City of St. Louis Park
5005 Minnetonka Boulevard
St. Louis Park, MN 55416

Dear Mr. Sterne:

I am writing to express my deep concern and distress brought about by information recently received which indicates the possibility of greater deposits of creosote on or about the site of my housing development than I had been made aware of up to this time. Also, I have recently learned that the process by which the City supervised the excavation required by the PCA stipulation which allowed the development of the Northern one half of the Oak Park Village PUD was less than thorough.

According to field personnel of the consulting engineers retained by the City for the Louisiana Avenue improvement approximately four years ago, 5,000 - 7,000 cubic yards of creosote soaked soil was excavated from the southerly portion of Oak Park Village while creating the new right of way for Louisiana Avenue and subsequently trucked to the Northern portion of the new Louisiana Avenue right of way (part of which is adjacent to Parcel 3, the site I am developing) where the material was dumped to create the embankment which now exists along the eastern edge of my site. At that time, Dave Rudberg was acting Director of Public Works.

Again, according to field personnel of the City's consulting engineer, the "Clean up" program of the Northern half of Oak Park Village which was performed in June-July of 1977 under supervision of Dave Rudberg and Dick Koppi, was haphazard. Apparently, some known pockets of creosote, particularly in the greenway area and extending into Parcel 1, were covered over and not excavated to the degree required in the stipulation agreement. Also, the field personnel are not strong at all in their belief that the known pocket of creosote at the Western edge of my parcel was adequately excavated.

In addition, the soils engineer who performed our boring program informed me confidentially of one shallow pocket of creosote in the Southeastern corner of my site (see attached memo).

I must insist that it is in the best interests of the City of St. Louis Park and necessary before we proceed to construction of our family housing project, that the extent of contamination in the East bank of my parcel and the Southeastern corner be identified and removed to conform to the stipulation agreement with the PCA. Also, it is essential that the clarification of the indemnification agreement from the City which we have requested be obtained prior to construction in order to protect the project investors from future liabilities which may exist due to the careless manner in which the City staff has handled this creosote problem. I believe the City should be willing to stand behind this development fully in order to establish the viability of the rest of the parcels.

It is time for the City to recognize that this is indeed a serious matter requiring candor and mutual trust among the various concerned parties. I am anxious to proceed to construction, and I trust these matters will have your usual prompt attention leading to corrective action.

Sincerely,

DIVERSIFIED EQUITIES CORPORATION

Jon E. Dickerson, President

SOIL TESTING SERVICES OF MINNESOTA, INC.
2405 ANNAPOLIS LANE SUITE 280
MINNEAPOLIS, MINNESOTA 55441 612–559–1900

September 13, 1977

Diversified Equities Corporation
600 Chamber of Commerce Building
15 South 5th Street
Minneapolis, Minnesota 55402

Attention: Mr. Jon Dickerson STS Job No. 90920-B

Re: Creosote Contaminated Soils Encountered at the Oak Park Village site in St. Louis Park, Minnesota.

Gentlemen:

The purpose of this letter is to confirm the telephone conversation between the writer and Mr. Jon Dickerson, on Wednesday, September 7, 1977, regarding the above referenced topic. During our field work for the supplementary subsurface investigation for this project, at the locations of borings 31 and 32, in the southeasterly portion of the site, pieces of sand and wood fibers mixed with creosote were found in the upper 18 to 24 inches of soil. Actual pieces of creosote were not found at greater depths in these borings, or in any other borings.

We wish to bring this matter to your attention, so that it can be dealt with properly to remove the contaminated materials from the site.

If you have any questions regarding this letter, or if we can be of any further assistance to you, please do not hesitate to contact us.

Yours very truly,

SOIL TESTING SERVICES OF MINNESOTA, INC.

William C. Kwasny, P.E.
President

WCK/ljl

SOIL TESTING SERVICES OF MINNESOTA, INC.
2405 ANNAPOLIS LANE SUITE 280
MINNEAPOLIS, MINNESOTA 55441 PHONE 612-559-1900

August 16, 1978

Miller, Hanson, Westerbeck, Bell Architects, Inc.
100 North 6th Street
Minneapolis, Minnesota 55403

Attention: Mr. Ed Bell STS Job Number 90920-B

RE: Design of underfloor gas venting system for the Oak Park Village Development in St. Louis Park, Minnesota

Gentlemen:

We are enclosing recommended design schemes for the vent system for buildings 1 and 2 for this development. This is in accordance with the modifications we discussed in our letter of July 7, 1978.

The writer visited with Mr. Harlan Schrupp on August 16, 1978. The recommended vent systems detailed herein were presented by Mr. Schrupp, and we concur that they are feasible for use on the project.

In summary, we recommend that a PVC gas venting pipe be directed into each cell comprised of the floor slab and a grade beam, where the cells have at least one wall on the outside of the structure. As you can see, the design details of this are relatively simple consisting of a length of PVC pipe extending back under the floor slab a distance of 5 feet. Please note that we have recommended that the thickness of the granular blanket be reduced to six inches, as opposed to the original design which called for twelve inches. The pipe would then be vented through the side of the building directly above the exterior grade. In order to cover the vent locations, a hood or shroud, similar to those used for venting of gas dryers, can be used. Such a hood can be painted or treated so as to blend rather inconspicuously with the structure.

In building number 1, where there are some cells isolated within the interior of the building between grade beams, interconnection of the cells to an exterior cell can be made by placing a piece of 2 inch PVC pipe over the grade beam cast within the floor slab. We are of the opinion that this would not structurally alter the floor slab strength, while still providing adequate venting.

If you have any questions regarding this letter, or if we can be of any further assistance to you, please do not hesitate to contact us.

Yours very truly,

SOIL TESTING SERVICES OF MINNESOTA, INC.

William C. Kwasny
Registered Professional Engineer, Minnesota

Enclosures

WCK/jag